2017 ANNUAL GROUNDWATER MONITORING REPORT

NORTHERN PETROLEUM BULK PLANT
521 BAY STREET
LYNDONVILLE, VT

ATC PROJECT NO. 0820426202
SMS NO. 2005-3397

JULY 2017

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1.0 INTRODUCTION

ATC Group Services, LLC (ATC) by virtue of its acquisition of Environmental Compliance Services, Inc. (ECS) on October 17, 2016, has prepared this supplemental site investigation (SSI) and annual groundwater monitoring report on behalf of Lumpsie, LLC for the Northern Petroleum Bulk Facility, now operated by Dead River Company, located at 521 Bay Street in St. Johnsbury, Vermont (Figures 1 and 1a). This work was completed in May 2017. Lumpsie, LLC is the responsible party to continue with regulatory required environmental monitoring of this site, which was formerly owned by Bradford Oil Company. The Vermont Department of Environmental Conservation (VT DEC) has designated the site as hazardous site #2005-3397 following the discovery of petroleum contamination. The site and surrounding properties are served by municipal sewer and water connections. The Passumpsic River is located approximately 700 feet east and downgradient of the site.

Monitoring was performed in accordance with ATC's 04 October 2016 work plan and cost estimate for SSI and 01 September 2016 work plan and cost estimate for groundwater monitoring, which were approved by Mr. James Donaldson of the VT DEC in an October 4 and December 22, 2016 email, respectively. The scope of work includes determining the extent of light non-aqueous phase liquid (LNAPL) using ultra violet induced fluorescence (UVIF) technology and annual groundwater sampling of select monitoring wells. The objective of this work will be to collect data to assist in determining the most cost effective strategy to remediate the LNAPL and to confirm if any of the LNAPL is migrating onto the Site from an offsite property.

2.0 SITE HISTORY

The site historically operated as a petroleum bulk fuel storage facility. In April 2010 the aboveground storage tanks (ASTs) were decommissioned. There were former underground storage tanks (USTs) that were decommissioned in 1991, including a 2,000-gallon diesel UST and 2,000-gallon gasoline UST. There was also a 500-gallon used oil UST that was removed in 2010. The site currently contains two buildings owned by Lumpsie, LLC. A propane company stores propane cylinders at the property. The site is also used to park shuttle buses operated by an adjacent business. A Site Plan is shown in Figure 2.

The decommissioned bulk fuel storage facility included gasoline, diesel, kerosene and #2 fuel oil stored in ASTs with a total capacity of approximately 130,000 gallons. An earthen bermed enclosure provided secondary containment for the ASTs, and the berm is still present. The base of the tank farm is reportedly composed of compacted clay. Oil from the bulk tanks was piped underground to a loading rack formerly located approximately 40 feet north of the tanks. The ASTs, the loading rack, and underground piping were decommissioned in April 2010 by Calkins Excavating, Inc.

One 500-gallon UST used to store No. 2 heating oil for onsite use, is currently located south of the office building. A former 1,000-gallon UST stored No. 2 fuel oil and was reportedly located at the storage garage.

From 1990 to 2010, the site operated as a bulk storage facility. In 1990, the ASTs were reportedly moved to the site from the adjacent property located at 590 Bay Street. The most recent generation of onsite ASTs were originally constructed in 1953 and 1962. For an unknown period prior to 1990, the site was operated as a petroleum bulk storage facility by Menut & Parks. Another petroleum bulk storage operation reportedly preceded the Menut & Parks operation. Aerial photographs dated 1962, 1974, and 1983 illustrate four apparent horizontal bulk storage ASTs located in the northwestern portion of the property, and three apparent vertical bulk storage tanks in the east-center portion of the site (see Figure 2).

An initial site investigation (ISI) was completed by ECS in December 2005. The ISI included a historical review of the site and nearby properties, a site inspection, drilling of 32 soil borings, the subsequent installation of 21 monitoring wells, and a sensitive receptor survey. The ISI concluded that soil and groundwater at the site have been impacted with petroleum-related volatile organic compounds (VOCs) associated with both onsite and offsite sources.

A Corrective Action Feasibility Investigation (CAFI) was completed by ECS in December 2006. ECS recommended that LNAPL removal be conducted with Keck passive hydrocarbon recovery skimmers in the vicinity of the southeastern plume. Additional monitoring wells were recommended to delineate the full extent of LNAPL and facilitate LNAPL recovery. In August 2007, ECS supervised the completion of five additional soil borings and subsequent installation of four monitoring wells (MW-36 through MW-40). Strong petroleum odors were observed in many of the soil borings. ECS also installed five 4-inch diameter extraction wells (EX-1 through EX-5) in the southeastern corner of the site to facilitate LNAPL removal with the use of passive skimmers. The extraction wells were installed in the vicinity of MW-5 and MW-7, where LNAPL was first encountered in 2005. Approximately 13 gallons of LNAPL were recovered from the five passive skimmers from 2007 through 2012.

In April 2010, Calkins Excavating decommissioned the petroleum ASTs at the site, along with underground piping and the loading rack (see Figure 2). Obvious black staining was observed and a

diesel fuel odor was detected as contaminated soils were removed from below the concrete pad under the loading rack. Soil headspace photoionization detector (PID) readings were measured up to 364 parts per million (ppm) at four feet below ground surface (bgs) under the former loading rack. Soils with PID readings below 50 ppm were stockpiled and used for backfill material. The final excavation area measured approximately 31 feet by 33 feet, with a maximum depth of 6 feet bgs. Petroleum contaminated soil remained in place at the completion of excavation activities at the loading rack area, with PID readings at the base of the excavation and sidewalls ranging from 43 ppm (eastern sidewall) to 205 ppm (base of excavation). Approximately 128 tons of petroleum-impacted soils were removed from the vicinity of the loading rack and transported for thermal treatment to Environmental Soil Management, Inc. (ESMI) of Loudon, New Hampshire.

During the April 2010 excavation, no soils were removed from the bermed area around the former ASTs. Four test pits (TP-1 through TP-4) were excavated to observe the geology and collect PID readings. In general, ECS observed approximately three inches of gravel, underlain by six inches of clay, one foot of sand, and native silty sand at approximately 2 feet bgs. PID readings in the bermed area ranged from 29.2 ppm in the clay unit at TP-1 to 262 ppm in the silty clay at TP-3. ECS and the VT DEC determined that the soils under the loading rack were the more critical "source area" soils contributing to the free-product plume north of the AST farm. The former AST area is clay-lined and will continue to serve as a semi-impervious barrier in the southeastern corner of the property.

On December 9, 2015, ECS oversaw the excavation of stained soil including four 55-gallon drums. The stained soils were reported by Dead River Company to have resulted from a release of hydraulic oil from a truck parked in the yard. ECS personnel detected a gasoline like odor during excavation and obtained PID soil headspace readings of 325 ppm. Test pits were performed and PID soil headspace readings generally increased outside of the stained soil area in a northerly direction towards the former location of petroleum storage tanks. Based on the limited data collected on December 9, 2015, it appears as though the contaminated soil exhibiting a gasoline like odor is not associated with the hydraulic oil leak.

Several nearby properties are listed as active or closed hazardous waste sites (Figure 1a). The Lewis Oil site, located adjacent to the site west of Bay Street, has reportedly served as a bulk oil storage facility for over 50 years. Prior to 1990, fuel was off-loaded by rail car at a rack located approximately 80 feet west and upgradient of the site. According to a Phase II report conducted for the former Canadian Pacific Railway, approximately 120 cubic yards of petroleum-contaminated soil were excavated and stockpiled on the Lewis Oil site in 1990. According to the VT DEC spill sites list, approximately 200 gallons of #2 fuel oil was released in January 1999 due to a tank overfill. The spills database indicated that Twin State Environmental provided clean up and the spill site was subsequently closed in February 1999. ECS observed a remediation system operating on the former Lewis Oil property during the fall of 2008. The system was being operated by Leggette, Brashears & Graham, Inc.

A lubricating oil business has occupied the former Bradford Oil Bulk Storage/office site for approximately 25 years, which is located north of the site (Figure 1a).

The former Canadian Pacific Railway property has operated as a rail yard facility since the 1850s. The central portion of the rail yard formerly included fueling operations in the 1960s, is approximately 600 feet northwest of the site.

3.0 SAMPLING PROCEDURES AND RESULTS

3.1 GROUNDWATER ELEVATION AND FLOW DIRECTION

During the 26 May 2017 sampling event, depth to groundwater was measured only in the wells sampled for laboratory analysis. Previously, on 4 May 2017, depth to groundwater and depth to LNAPL was measured in all available onsite monitoring wells. Groundwater elevation data from 4 and 26 May 2017 are presented in Table 1a and 1b, respectively. The depths to groundwater during the 4 May 2017 event ranged from 1.72 feet bgs (MW-40) to 5.43 feet bgs (MW-28). Groundwater in the unconfined surficial aquifer at the site appeared to flow generally east toward the Passumpsic River, which is consistent with previous data. The groundwater table at the site is relatively flat. The vertical groundwater flow components at the site, and the hydraulic relationship between the shallow unconfined aquifer and the bedrock aquifer, are currently unknown.

The groundwater flow direction map was prepared using the more comprehensive data from 4 May 2017, and is presented as Figure 3. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet. Groundwater elevations for wells that contained LNAPL were corrected by multiplying the LNAPL thickness by the specific gravity of fuel oil (assumed to be 0.9) and subtracting the result from the measured depth to water. Groundwater elevations at MW-12R, MW-13R, MW-36, and MW-40 are suspected to be anomalous due to heaving of surveyed top of poly-vinyl chloride (PVC) casing.

PID readings were obtained from the monitoring well heads during the 4 May 2017 gauging event. PID readings ranged from 0.0 ppm to 246.7 ppm in MW-37. These PID readings are presented in Table 1a with groundwater elevation data.

3.2 GROUNDWATER SAMPLING AND LABORATORY ANALYSIS

Groundwater samples were collected on 26 May 2017 from onsite monitoring wells MW-5, MW-13R, MW-37, MW-38, MW-39, and MW-40; and offsite wells MW-2 (existing) and MW-28. The samples collected were analyzed for the possible presence of VOCs on the Vermont 8021B list by EPA Method 8260B. Results are presented in Table 2. A contaminant distribution map (Figure 4) was prepared using the groundwater quality data from 26 May 2017, LNAPL gauging data from 4 May 2017 and LNAPL delineation data from 9 May 2017.

Vermont Groundwater Enforcement Standards (VGES) were exceeded for one or more petroleum hydrocarbons in six of the eight sampled monitoring wells. Total BTEX (sum total of benzene, toluene, ethylbenzene, and xylenes) concentrations in the sampled wells ranged from below laboratory reporting limits in MW-40 to 4,267 micrograms per liter (µg/L) in onsite well MW-37. The benzene concentration in MW-39 at the leading edge of the north contaminant plume was 466 µg/L; a decrease from the historic high concentration detected in May 2014.

Prior to groundwater sample collection, the monitoring wells were purged of three times their volume with disposable bailers in accordance with ATC protocols. Purge water was discharged directly to the ground in the vicinity of each well. All samples were transported under chain-of-custody in an ice-filled cooler to Eurofins Spectrum Analytical, Inc. of Agawam, Massachusetts. A trip blank and a duplicate sample (MW-39) were collected to ensure that adequate quality assurance/quality control (QA/QC)

standards were maintained. The duplicate sample results were within the EPA recommended relative percent difference of 30 percent. No VOCs were detected in the trip blank. For the laboratory control samples, methyl tert-butyl ether (MTBE) percent recovery was outside individual acceptance criteria, but within overall method allowances. Reported results for MW-2 existing, MW-28 and MW-37 are considered to have a potentially high bias. The laboratory analytical report is presented in Appendix A. Time-series graphs are presented in Figures 5-15.

3.3 LNAPL GAUGING & RECOVERY RESULTS

LNAPL thickness was gauged monthly at the site until March 2012 in select monitoring wells and in extraction wells. Keck PRC 3-liter passive skimmers were installed in several 4-inch extraction wells in 2007-2008 to recover LNAPL from near the former loading rack (southeastern plume). Following the March 2012 event, Mr. Ashley Desmond of the VTDEC requested that monthly LNAPL gauging and extraction be discontinued.

Current and historical LNAPL thicknesses are tabulated in Table 3. During the 4 and 26 May 2017 gauging event, LNAPL was detected in monitoring wells MW-17 at a thickness of 0.58 and 0.41 feet, respectively, MW-18 at a thickness of 0.32 and 0.36 feet, respectively and in MW-22 at a thickness of 1.30 and 0.16 feet, respectively.

Approximately 18.2 gallons of LNAPL have been recovered from site extraction wells and monitoring wells since manual LNAPL recovery began in December 2007 (Table 4). During the 26 May 2017 groundwater monitoring and LNAPL removal event, a total of 0.08 gallons of LNAPL was recovered from MW-17, MW-18, and MW-22. Recovered LNAPL is stored in a 55-gallon drum onsite, pending proper disposal.

4.0 SUPPLEMENTAL SITE INVESTIGAITON

A supplemental site investigation was performed on 9 May 2017 to determine the extent of LNAPL in the northwestern plume area using UVIF technology. A Geoprobe® Optical Imaging Profiler (OIP) was operated by S2C2, Inc. using high intensity UV light to fluoresce hydrocarbons in the soil matrix. An image of the soil was captured by a camera and analyzed for percent fluorescence. Any value over 0.1% fluoresced area indicates the presence of LNAPL. The lower the value indicates a lower percentage of pore space in the soil matrix containing LNAPL. Soil type was also logged using electrical conductivity in millisiemens per meter (mS/m). Electrical conductivity ranges from 0–5 mS/m indicating a gravel, 5-10 mS/m indicating a coarse sand, 10-30 mS/m indicating a sand, 30-70 mS/m indicating a silt and greater than 70 mS/m indicating a clay. The LNAPL delineation spatially defined the horizontal and vertical extent of LNAPL at the site.

A total of 13 soil borings were installed using the Geoprobe® OIP (OIP-1 through OIP-13). LNAPL was detected in all soil borings except for OIP-11, with trace surficial detections in OIP-1. The range of fluoresced areas was from 0.1 to 87.8 % with the highest reading recorded in OIP-7. The soil type identified in the northwestern portion of the site is gravel from surface to 2 feet bgs, followed by coarse to fine sand from 2 to 13 feet bgs and silt from 13 to 15 feet bgs. The soil type in the central and northeastern portion of the site is gravel from surface to 1 feet bgs, followed by silt and clay from 1 to 10 feet bgs, fine sand from 10 to 13 feet bgs and silt from 13 to 15 feet bgs. The following is a description of each soil boring's maximum fluoresced area, depth and soil type;

- OIP-1, 0.2% at 1.85 feet bgs in sand,
- OIP-2, 87.3% at 3.25 feet bgs in clay,
- OIP-3, 80.4% at 4.45 feet bgs in clay,
- OIP-4, 81.4% at 4.05 feet bgs in clay,
- OIP-5, 86.1% at 3.05 feet bgs in gravel,
- OIP-6, 86.9% at 4.20 feet bgs in sand,
- OIP-7, 87.8% at 3.80 feet bgs in sand,
- OIP-8, 36.8% at 1.25 feet bgs in gravel,
- OIP-9, 84.0% at 4.75 feet bgs in clay,
- OIP-10, 79.8% at 4.55 feet bgs in clay,
- OIP-11, no LNAPL detected
- OIP-12, 27.8% at 5.85 feet in sand, and
- OIP-13, 4.5% at 5.70 feet in sand.

Based on the fluoresced area and depth, it was apparent that there was a surficial LNAPL plume, a shallow LNAPL plume and a deep LNAPL plume. It is likely that the heterogeneous geology has influenced the distribution of LNAPL along with multiple petroleum releases occurring at different times. The surficial plume was from surface to 2.5 feet bgs located near MW-17 (OIP-1, OIP-2 and OIP-8), the shallow LANPL plume was from 3 to 8 feet bgs and the deep LNAPL plume was from 8.5 to 10.5 feet bgs. The LNAPL plumes were all separated by 0.5 feet of unimpacted soil. The deeper LNAPL plume did not have as high of values for fluoresced area and may be a heavier LNAPL such as lubricating oil; which was previously identified in MW-2 ECS. The following is a description of soil boring's fluoresced area, depth and soil type of the deeper LNAPL plume;

- OIP-2, 1.2% at 10.05 feet bgs in silt,

- OIP-3, 55.0% at 9.95 feet bgs in silt,
- OIP-4, 23.3% at 10.60 feet bgs in clay,
- OIP-5, 80.6% at 8.20 feet bgs in sand,
- OIP-6, 83.0% at 8.35 feet bgs in coarse sand,
- OIP-7, 67.5% at 9.05 feet bgs in silt,
- OIP-8, 15.3% at 9.35 feet bgs in silt,
- OIP-9, 25.5% at 8.75 feet bgs in clay,
- OIP-10, 10.7% at 8.40 feet bgs in silt,

The OIP logs are located in Appendix B for both the shallow and deep plume. The OIP logs captured fluoresced area, depth and soil type as a single data point as compared to the reported results above which is an average of the data points collected at a speed of 30 frames per second over a 0.05 foot interval. Figures showing the cross sections of A-A' and B-B' are depicted on Figures 2, 16 and 17.

5.0 UPDATED CONCEPTUAL SITE MODEL

The site and portions of adjacent properties to the east and west have been impacted by at least two petroleum sources including #2 fuel oil and gasoline resulting in areas of petroleum contamination in the northwest and southeast portions of the site. Contaminant distribution and historical information indicate that the contamination at the facility is from multiple releases, including both onsite and offsite sources. Two contaminant plumes have been identified and are described below. Groundwater in the unconfined surficial aquifer appears to flow generally southeast toward the Passumpsic River. The depth to groundwater ranges from 2 to 6 feet bgs. The site hydrogeology consists of fine to coarse sands in the upper layer of the site followed by silt at 13 feet bgs. Clay and silt are more prevalent in the northeastern portion of the site in the upper layer to 10 feet bgs.

5.1 NORTHWESTERN PLUME

The northwestern plume is the larger of the two and is defined by LNAPL currently or previously detected in MW-1, MW-17, MW-18, MW-19, MW-22 and MW-28 (see Figure 2). Additional LNAPL delineation was performed in May 2017. The LNAPL plume extends from the west side of Bay Street, bounded to the south by MW-28, to the northeast portion of the former Northern Petroleum Bulk storage yard, bounded to the north by MW-37, to the east by MW-38 and to the south by MW-39. The outer limits of the plume are delineated by relatively lower VOC concentrations in groundwater and/or relatively low PID readings in soil borings. The western, offsite, upgradient extent of this plume, beyond MW-28, has not been defined. The downgradient leading edge of this plume may merge with the south plume. The monitoring wells onsite located on the fringe of the LNAPL plume, MW-37 and MW-38, historically exhibit the highest dissolved-phase contaminant concentrations on the property. The possibility of an offsite investigation was discussed with the VT DEC in 2012. Complications with site access from upgradient property owners (rail road and VT Agency of Transportation) hindered this additional investigation.

Data suggest that a release related to the former bulk storage tanks may have contributed to the contamination in this portion of the site, but an offsite source west (upgradient) of MW-28 is possible. Previously, LNAPL in the upgradient, offsite monitoring well MW-28 was identified by laboratory analysis as gasoline. No. 2 fuel oil was identified in onsite soils above the water table in MW-1, and estimated to be present in MW-2 ECS, MW-17 and MW-18 in soil both above and below the water table. Other oil (which may include lubricating, cutting, and/or silicon oil) was also identified above the water table in MW-2 ECS. No. 2 fuel oil and gasoline were detected in groundwater in these wells. Subsurface soils in this area generally consist of a fine to medium sand in the upper layer with underlying coarse sand and gravels. In all soil borings, the top of the water table is within the finer sands. PID readings in soil borings indicate that the vertical extent of contamination extends into the underlying coarse sand and gravel, where present. PID readings in soil boring locations in this area generally increased with increasing depth.

The additional LNAPL delineation defined the vertical extent of LNAPL. There is surficial LNAPL from surface to 2.5 feet bgs located near MW-17 (OIP-1, OIP-2 and OIP-8). This area had a surface spill of hydraulic oil reported in December 2015 where surface excavation occurred. There may be residual LNAPL beyond the extent of the excavation. There are also shallow and deep LNAPL plumes that are separated by approximately 0.5 feet of unimpacted soil. The shallow LNAPL plume ranges from 3 to 8 feet bgs and the deep LNAPL plume ranges from 8.5 to 10.5 feet bgs. The deep LNAPL plume is most likely a heavier LNAPL such as lubricating oil; which was previously identified in MW-2 ECS. The soil type identified in the northwestern portion of the site is gravel from surface to 2 feet bgs, followed by coarse to fine sand from 2 to 13 feet bgs and silt from 13 to 15 feet bgs. The soil type in the central and

northeastern portion of the site is gravel from surface to 1 feet bgs, followed by silt and clay from 1 to 10 feet bgs, fine sand from 10 to 13 feet bgs and silt from 13 to 15 feet bgs.

5.2 SOUTHEASTERN PLUME

The southeastern plume is defined by LNAPL previously detected in MW-5, MW-7, MW-12, MW-40, EX-2, EX-4, and EX-5 near the former dispenser rack. The downgradient limits are delineated by relatively lower VOC concentration in groundwater and/or relatively low PID readings in soil borings. Based on the most recent groundwater data, the footprint of the southeastern plume is diminishing. It use to extend approximately 40 feet beyond the Northern Petroleum property line; however MW-40, the most eastern well onsite, does not have any petroleum related VOC detections. The upgradient extent of this plume is less obvious, and may merge with the north contaminant plume.

Data suggest that a release related to the decommissioned dispenser rack and bulk storage AST system may have contributed to the contamination in this portion of the site. No. 2 fuel oil was identified in soils both above and below the water table in MW-5 and MW-12, both of which are located upgradient of MW-7. No. 2 fuel oil was also identified in groundwater in wells in this area. The hydrogeology in this area of the site is similar to that described in the previous section. PID readings in soil borings indicate that the vertical extent of contamination extends into the underlying coarse sand and gravel layer, generally decreasing in concentration with increasing depth. Corrective actions in the southeastern plume area have eliminated the presence of LNAPL and accelerated the reduction of dissolved-phase groundwater concentrations.

6.0 CONCLUSIONS

Based on the results described above, ATC concludes the following:

1. Groundwater in the unconfined surficial aquifer at the site is relatively flat (less than one percent gradient); however, it appears to flow generally southeast toward the Passumpsic River, which is consistent with previous data.

2. LNAPL was detected in three monitoring wells in the northwestern plume area during 4 and 26 May, 2017 gauging events, at thicknesses up to 1.30 feet (MW-22). No LNAPL was detected in the southeastern plume area. Approximately 18.2 gallons of LNAPL has been recovered since December 2007. The LNAPL thickness is increasing in MW-17 and MW-18 and decreasing in MW-22 since the start of monitoring.

3. VGESs were exceeded for one or more petroleum hydrocarbons in six of the eight monitoring wells sampled on 26 May 2017. Groundwater from monitoring well MW-37 exhibited the highest elevated dissolved-phase BTEX, trimethylbenzenes, and naphthalene concentrations. Monitoring well MW-38 exhibited the highest MTBE concentration. Total BTEX concentrations are increasing in MW-2 Existing, MW-13R, and MW-39 and decreasing in MW-5, MW-28, MW-37, MW-38, and MW-40 since the start of monitoring.

4. LNAPL delineation was performed including the installation of 13 soil borings. LNAPL was detected in all soil borings except for OIP-11, with trace surficial detections in OIP-1. OIP-7 had the highest fluoresced area in the LNAPL plume, which is located just north of MW-39. A surficial, shallow and deep LNAPL plume were detected. The surficial plume was from surface to 2.5 feet bgs located near MW-17 (OIP-1, OIP-2 and OIP-8), the shallow LNAPL plume was from 3 to 8 feet bgs from just north of MW-28 (OIP-12) to MW-38 (OIP-10) and the deep LNAPL plume was from 8.5 to 10.5 feet bgs from MW-22 (OIP-5) to MW-38 (OIP-10). The LNAPL plumes are separated by 0.5 feet of unimpacted soil. The deeper LNAPL plume did not have as high of values for fluoresced area as the shallow LNAPL plume and may be a heavier LNAPL such as lubricating oil; which was previously identified in MW-2 ECS. It is also likely that the heterogeneous geology has influenced the distribution of LNAPL along with multiple petroleum releases occurring at different times.

5. The extent of the northwestern LNAPL plume area is from the west side of Bay Street to the northeast portion of the former Northern Petroleum Bulk storage yard. The outer limits of the LNAPL plume are delineated by relatively lower VOC concentrations in groundwater and/or relatively low PID readings in soil borings. This includes lower VOC concentrations in MW-28 on the west side of Bay Street and low PID readings in soil borings located to the north, east and south (SB-6, SB-15, SB-20, and SB-21). The western, offsite, upgradient extent of this plume, beyond MW-28, has not been defined. The downgradient leading edge of this plume may merge with the south plume.

6. The LNAPL delineation indicates that LNAPL is widespread in the northwestern plume area and without a corrective action to address this plume, a Sites Management Activity Completed (SMAC) designation for the site will be prolonged.

7.0 RECOMMENDATIONS

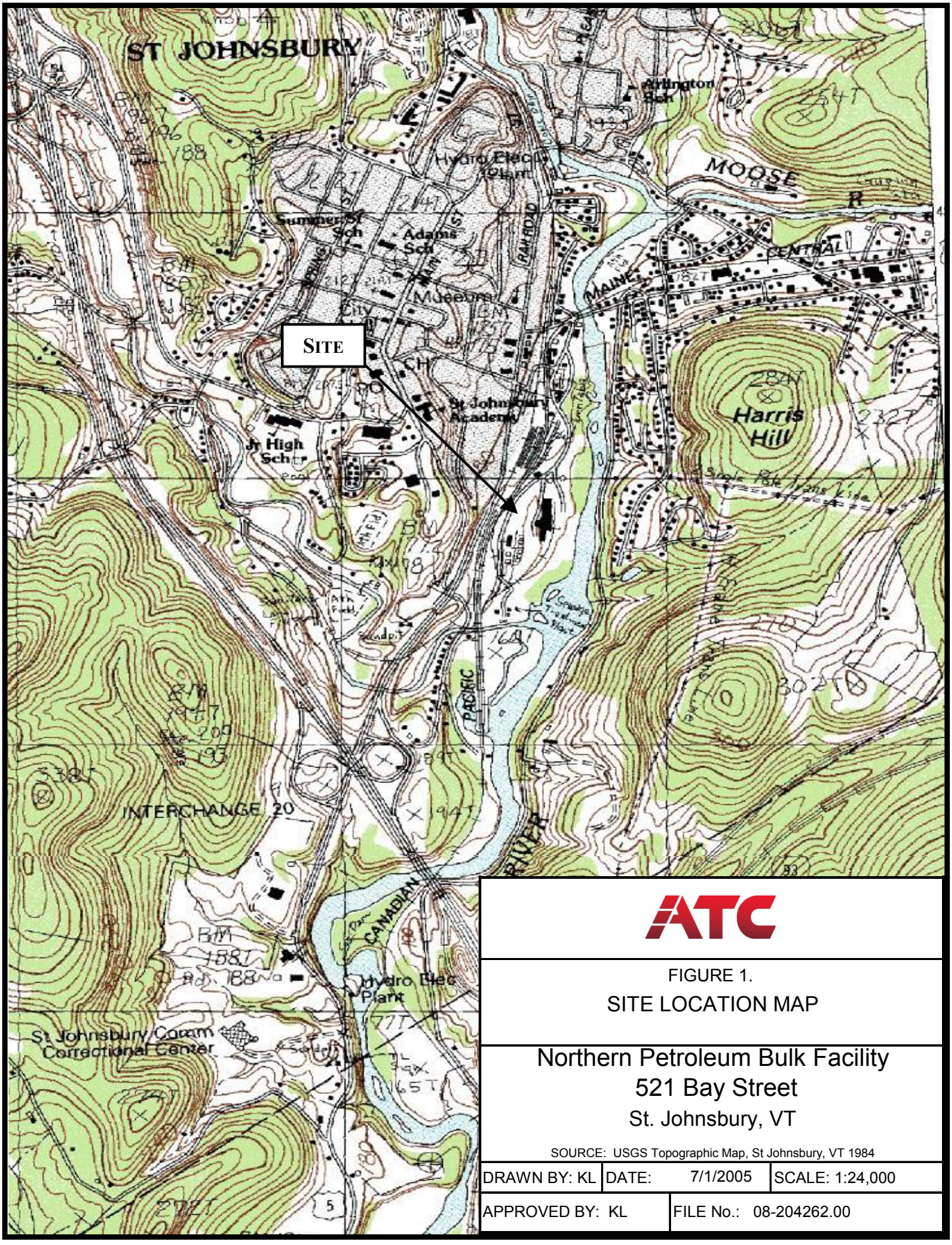
On the basis of the results of this investigation and the conclusions stated above, the site is not eligible for a Sites Management Activity Completed (SMAC) designation. ATC recommends the following:

1. Annual groundwater sampling and reporting should continue at the site, with the next sampling event scheduled for June 2018. Manual LNAPL recovery with a bailer should occur during the annual groundwater monitoring until a remedial alternative is selected. At this time manual recovery of existing wells is not optimal due to the small diameter of these monitoring wells located in the LNAPL plume.

2. An evaluation of remedial alternatives should be performed of the northwestern plume area. This evaluation could include LNAPL recovery and/or dissolved and vapor phase remediation. Excavation may not be feasible based on the shallow depth to groundwater and the extent of the LNAPL plume. A pilot study should be performed to evaluate a full scale multi-phase extraction (MPE) system or a passive/active LNAPL recovery system. In order to perform the pilot study, the installation of 4-inch diameter extraction wells in the northwestern plume area should occur to capture both the shallow and the deep LNAPL plumes.

3. Monitoring wells should be resurveyed due to suspected heaving of surveyed top of PVC casing in MW-12R, MW-13R, MW-36, and MW-40.

FIGURES



ATC

FIGURE 1.

SITE LOCATION MAP

Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

SOURCE: USGS Topographic Map, St Johnsbury, VT 1984

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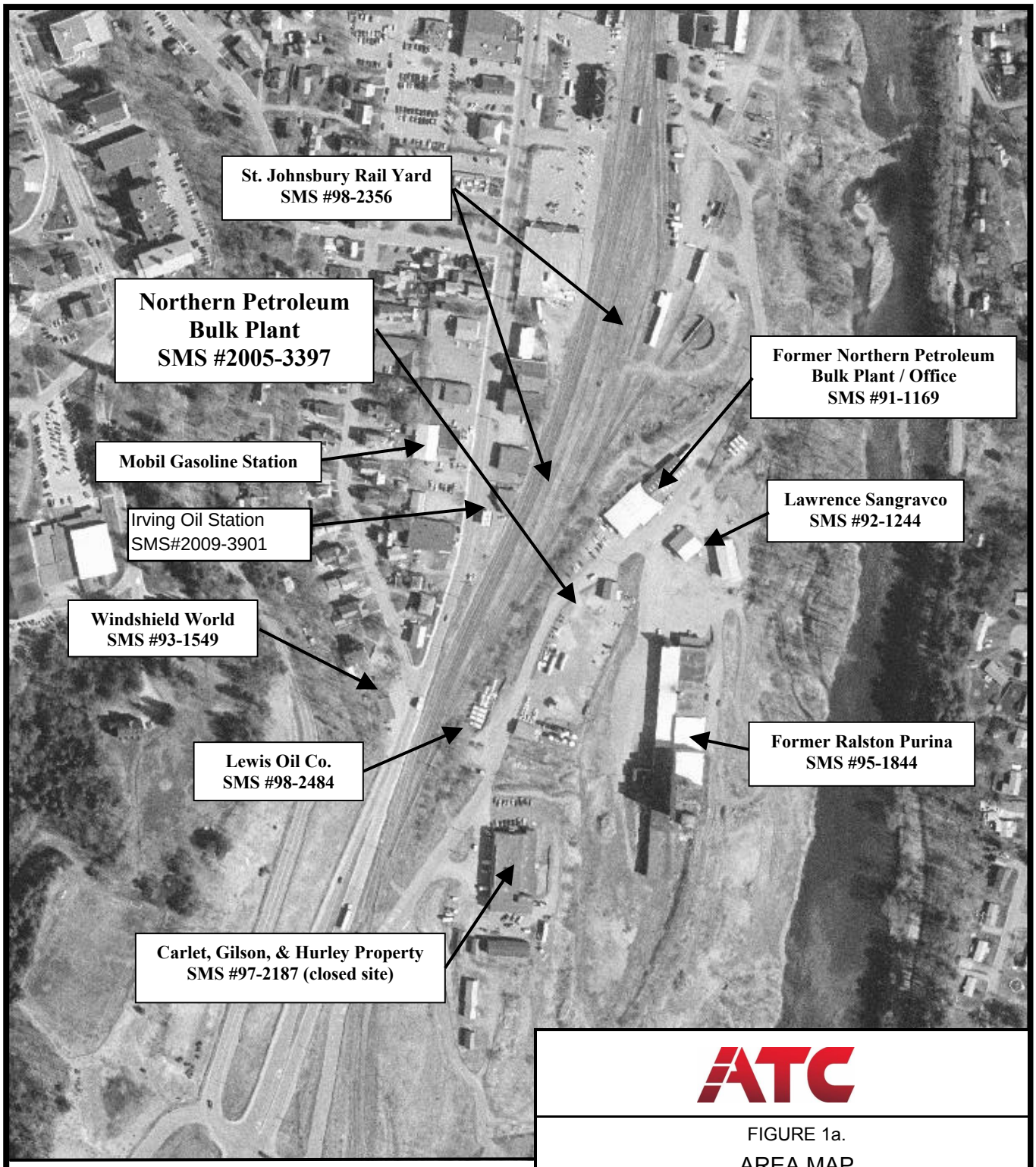

FIGURE 1a.

AREA MAP

Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

SOURCE: USGS Arial Photograph, St Johnsbury, VT 1999

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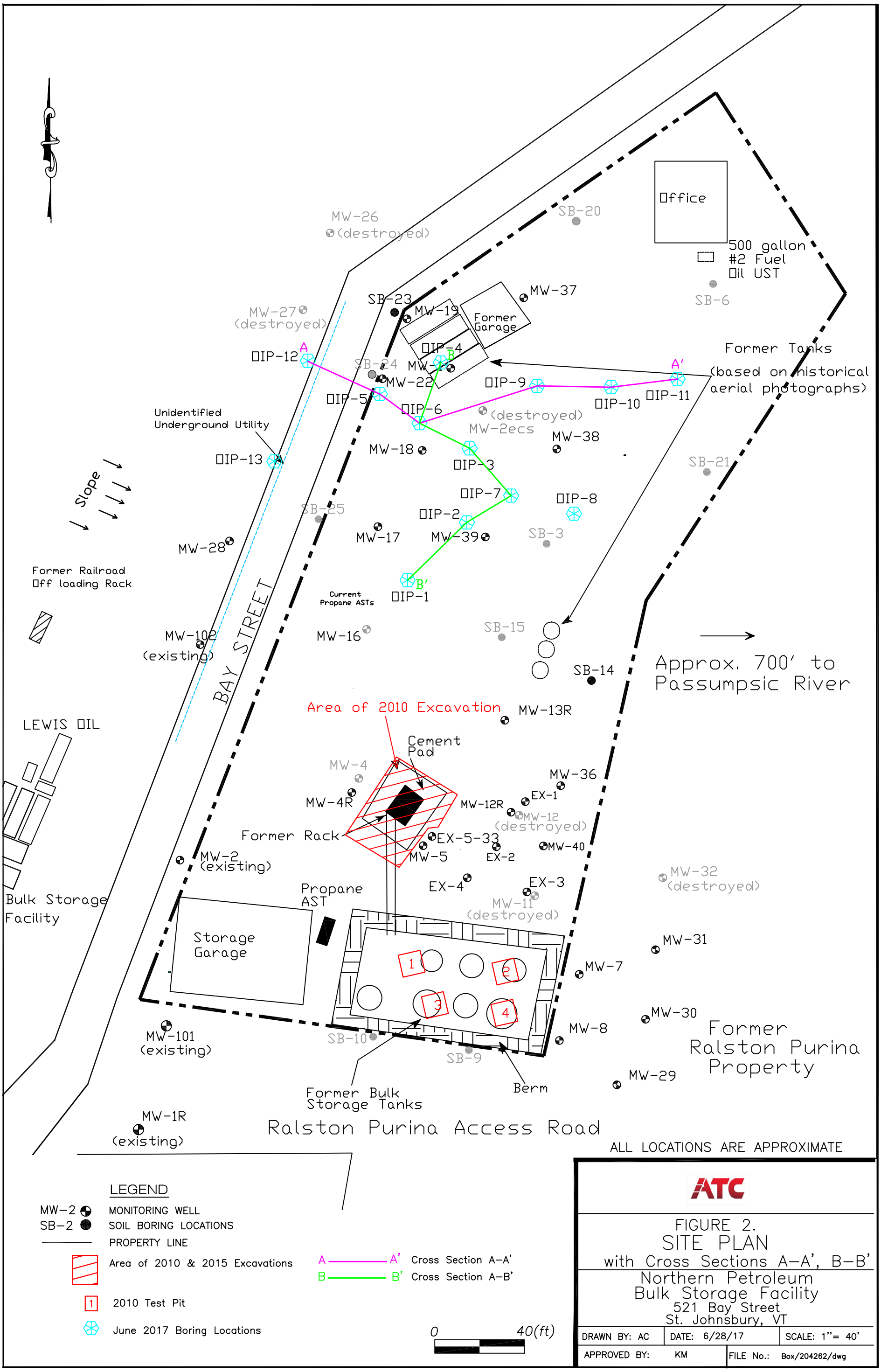

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FIGURE 2.
SITE PLAN
with Cross Sections A-A', B-B'
Northern Petroleum
Bulk Storage Facility
521 Bay Street
St. Johnsbury, VT

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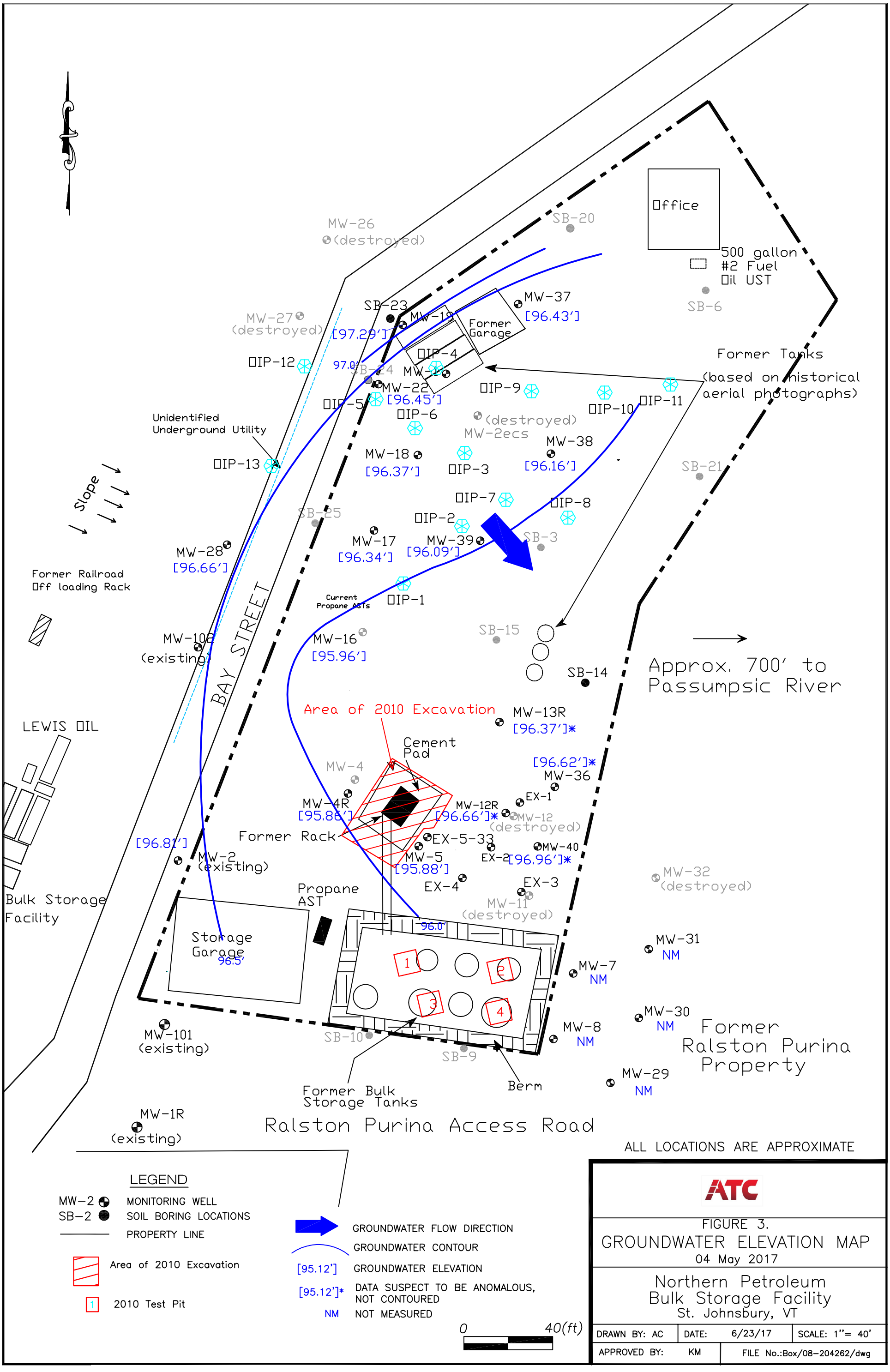

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FIGURE 3.
GROUNDWATER ELEVATION MAP
04 May 2017

Northern Petroleum
Bulk Storage Facility
St. Johnsbury, VT

DRAWN BY: AC	DATE: 6/23/17	SCALE: 1"= 40'
APPROVED BY: KM	FILE No.:Box/08-204262/dwg	

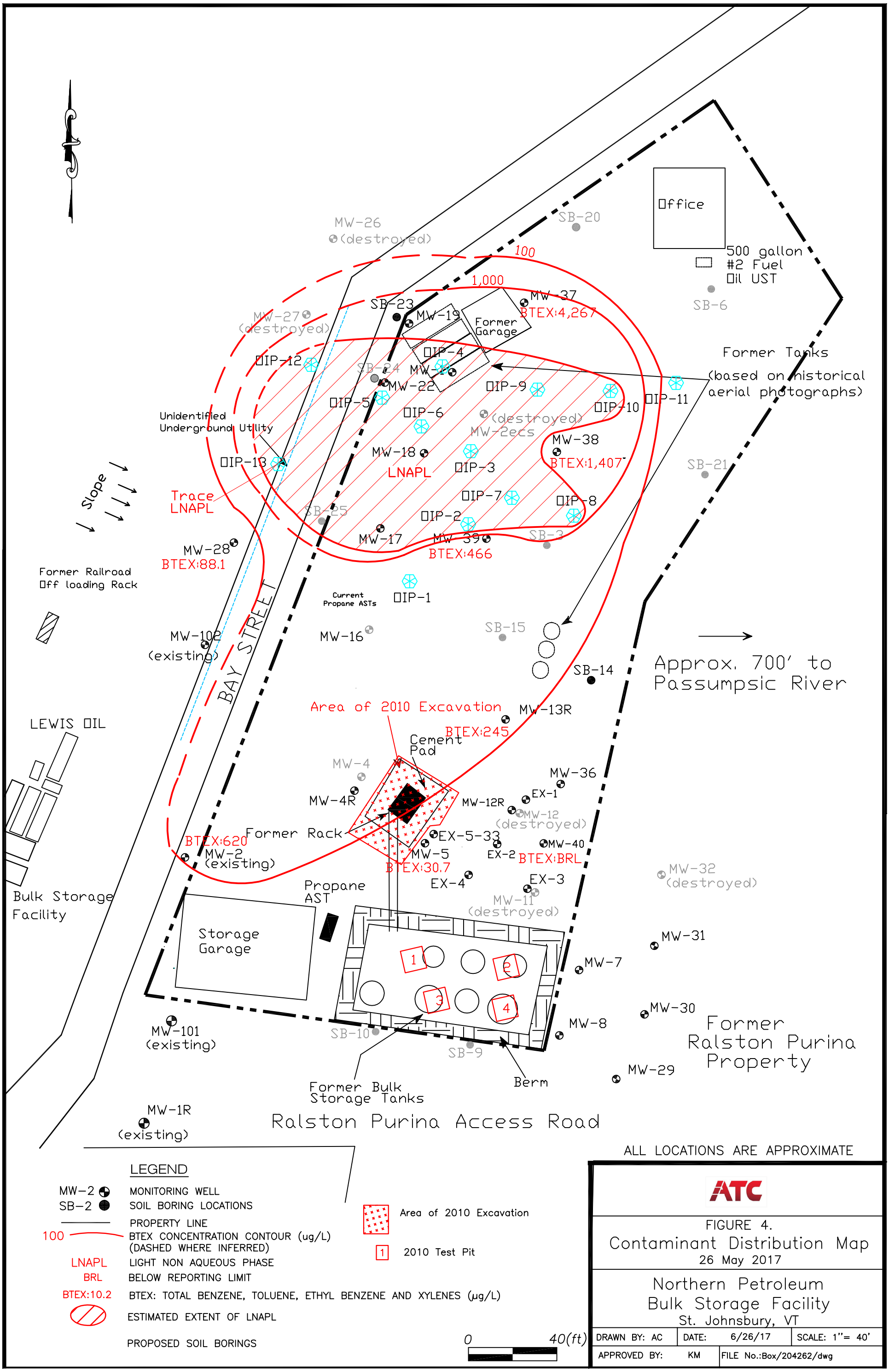
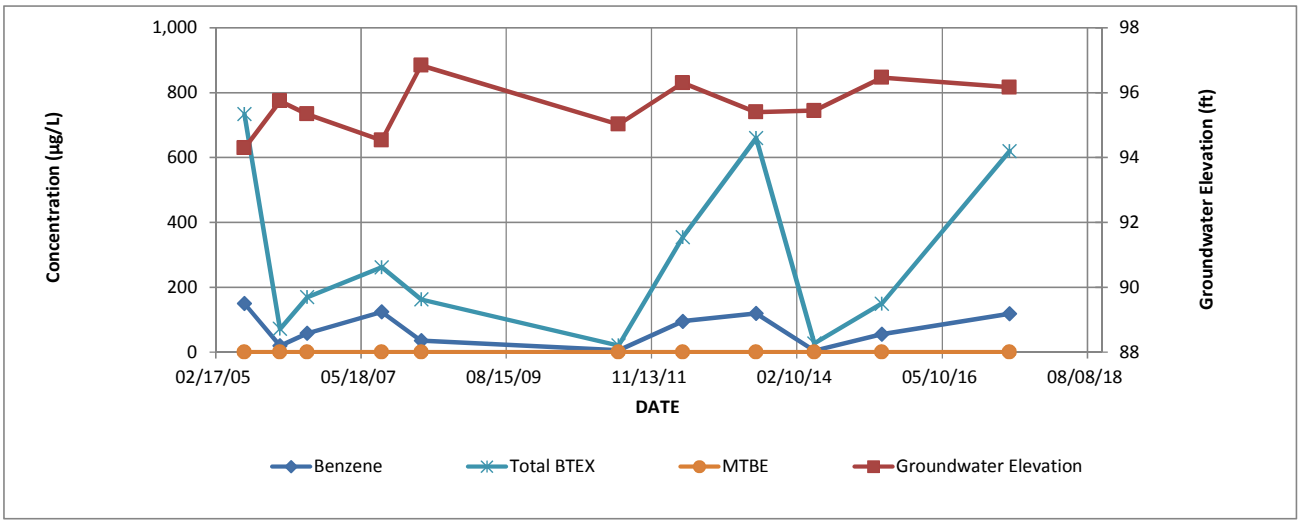

Office
500 gallon
#2 Fuel
Oil UST
SB-6
SB-20
MW-26
(destroyed)
100
1,000
MW-37
BTEX:4,267
SB-23
MW-19
Former
Garage
MW-27
(destroyed)
IP-12
IP-4
SB-24
MW-1
MW-22
IP-9
IP-5
IP-6
IP-10
IP-11
Former Tanks
(based on historical
aerial photographs)
Unidentified
Underground Utility
(destroyed)
MW-2ecs
MW-38
BTEX:1,407
IP-13
MW-18
LNAPL
IP-3
IP-7
IP-8
SB-21
Trace
LNAPL
Slope
SB-25
IP-2
MW-17
MW-39
BTEX:466
SB-3
MW-28
BTEX:88.1
Former Railroad
Off loading Rack
Current
Propane ASTs
IP-1
MW-102
(existing)
MW-16
SB-15
BAY STREET
Approx. 700' to
Passumpsic River
SB-14
Area of 2010 Excavation
MW-13R
BTEX:245
LEWIS OIL
Cement
Pad
MW-4
MW-36
MW-4R
EX-1
MW-12R
MW-12
(destroyed)
Former Rack
EX-5-33
BTEX:620
MW-2
(existing)
MW-5
BTEX:30.7
EX-2
MW-40
BTEX:BRL
Propane
AST
EX-4
EX-3
MW-32
(destroyed)
MW-11
(destroyed)
Bulk Storage
Facility
Storage
Garage
MW-31
MW-7
1
2
3
4
MW-30
MW-8
MW-101
(existing)
SB-10
SB-9
Former
Ralston Purina
Property
MW-29
Former Bulk
Storage Tanks
Berm
MW-1R
(existing)
Ralston Purina Access Road
LEGEND
MW-2 MONITORING WELL
SB-2 SOIL BORING LOCATIONS
PROPERTY LINE
100 BTEX CONCENTRATION CONTOUR (ug/L)
(DASHED WHERE INFERRED)
LNAPL LIGHT NON AQUEOUS PHASE
BRL BELOW REPORTING LIMIT
BTEX:10.2 BTEX: TOTAL BENZENE, TOLUENE, ETHYL BENZENE AND XYLENES (µg/L)
ESTIMATED EXTENT OF LNAPL
PROPOSED SOIL BORINGS
Area of 2010 Excavation
1 2010 Test Pit
0
40(ft)
ALL LOCATIONS ARE APPROXIMATE
ATC
FIGURE 4.
Contaminant Distribution Map
26 May 2017
Northern Petroleum
Bulk Storage Facility
St. Johnsbury, VT
DRAWN BY: AC
DATE: 6/26/17
SCALE: 1"= 40'
APPROVED BY: KM
FILE No.:Box/204262/dwg

FIGURE 5. MW-2 Existing
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

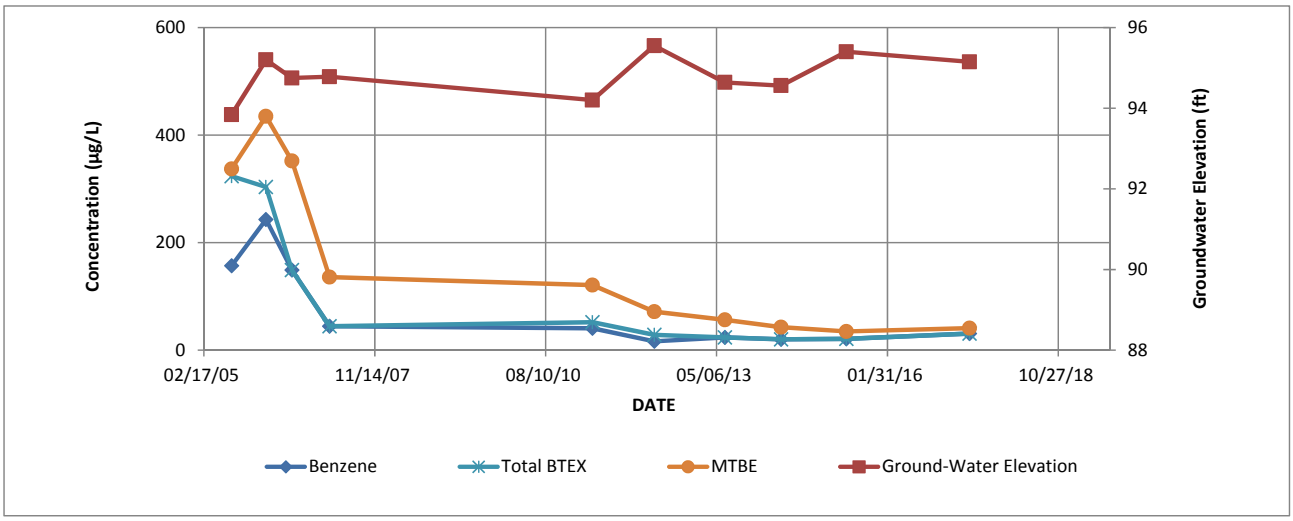


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Groundwater Elevation
07/29/05	**150**	**25.7**	**121**	**437**	**733.7**	BRL<10.0	**167.3**	**50.6**	NA	NA	94.29
02/15/06	**19.9**	**4.0**	**20.7**	**27.3**	**71.9**	BRL<1.0	**18.6**	**3.3**	NA	NA	95.74
07/18/06	**58.4**	**8.4**	**37.2**	**65.8**	**169.8**	BRL<1.0	**52.0**	**12.4**	NA	NA	95.34
09/12/07	**124**	**12.6**	**32.3**	**92.8**	**261.7**	BRL<1.0	**44.4**	**16.0**	NA	NA	94.53
04/22/08	**35.7**	**5.8**	**37.0**	**84.4**	**162.9**	BRL<1.0	**58.5**	**13.6**	BRL<1.0	BRL<1.0	96.84
06/02/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.02
05/11/11	**5.4**	**1.1**	**3.6**	**10.3**	**20.4**	BRL<1.0	**7.2**	**1.3**	BRL<0.5	BRL<1.0	96.30
05/07/12	**95.2**	**15.2**	**55.8**	**188.3**	**354.5**	BRL<1.0	**105.9**	**41.2**	BRL<5.0	BRL<1.0	95.40
06/24/13	**119**	**23.2**	**109**	**408.6**	**659.8**	BRL<5.0	**192.4**	**88.7**	BRL<2.5	BRL<5.0	95.44
05/19/14	**4.4**	**1.2**	**4.3**	**16.7**	**26.6**	BRL<1.0	**4.9**	**1.4**	BRL<0.5	BRL<1.0	96.46
06/05/15	**55.4**	**7.2**	**30.0**	**56.8**	**149.4**	BRL<5.0	**21.4**	**7.5**	BRL<2.5	BRL<5.0	96.16
05/26/17	**118**	**29.0**	**121**	**352**	**620**	BRL<1.0	**254**	**70.5**	BRL<0.5	BRL<1.0	96.26
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
EDB - 1,2-Dibromoethane
DCA - 1,2-Dichloroethane

FIGURE 6. MW-5
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

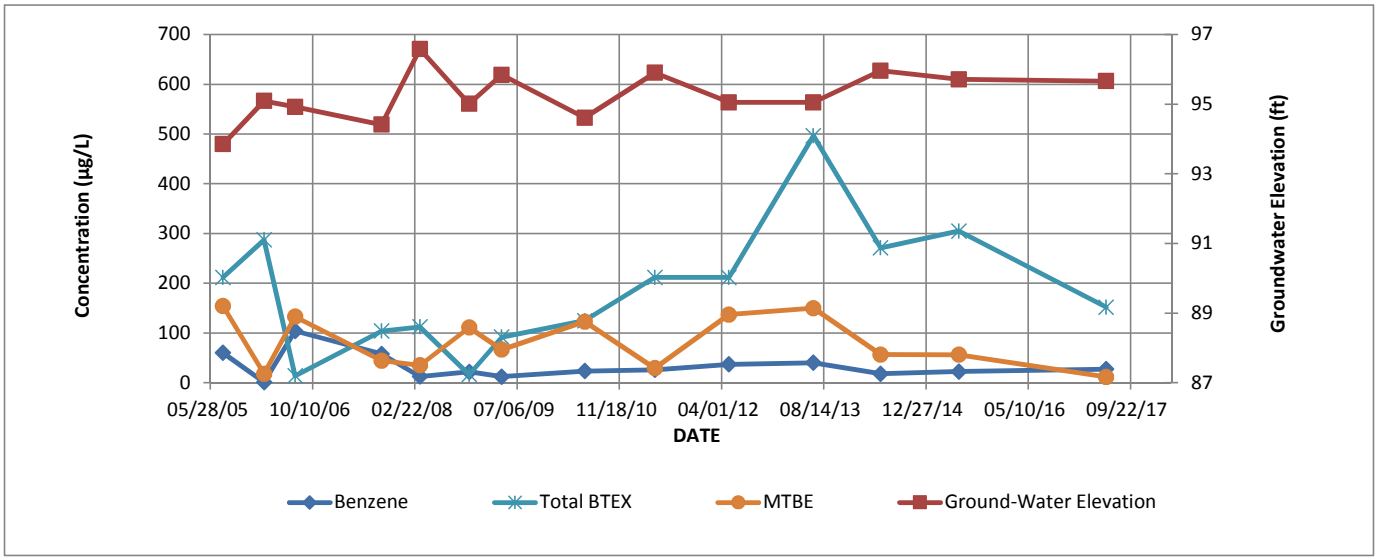


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**157**	BRL<5.0	**21.6**	**145**	**323.6**	**337**	**214.6**	**93.7**	NA	NA	93.84
02/15/06	**243**	BRL<5.0	**10.7**	**49.7**	**303.4**	**435**	**83.0**	**26.6**	NA	NA	95.20
07/17/06	**149**	BRL<5.0	BRL<5.0	BRL<15.0	**149**	**352**	**20.5**	**12.8**	NA	NA	94.75
02/22/07	**44.6**	BRL<1.0	BRL<1.0	BRL<3.0	**44.6**	**136**	**8.7**	**4.9**	NA	NA	94.78
04/22/09	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	--
06/02/10	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.20
05/11/11	**40.6**	BRL<5.0	BRL<5.0	**11.2**	**51.8**	**121**	**80.4**	BRL<5.0	BRL<2.5	BRL<5.0	95.55
05/07/12	**16.4**	BRL<5.0	BRL<5.0	**12**	**28.4**	**71.7**	**52.4**	BRL<5.0	BRL<2.5	BRL<5.0	94.64
06/24/13	**23.6**	BRL<5.0	BRL<5.0	BRL<15.0	**23.6**	**56.4**	**12.2**	**9.2**	BRL<2.5	BRL<5.0	94.56
05/19/14	**20.2**	BRL<1.0	BRL<1.0	BRL<3.0	**20.2**	**42.8**	**1.8**	BRL<1.0	BRL<0.5	BRL<1.0	95.40
06/05/15	**21.0**	BRL<1.0	BRL<1.0	BRL<3.0	**21.0**	**34.8**	**1.5**	BRL<1.0	BRL<0.5	BRL<1.0	95.15
05/26/17	**30.7**	BRL<1.0	BRL<1.0	BRL<3.0	**30.7**	**41.0**	**1.3**	**1.7**	BRL<0.5	BRL<1.0	94.94
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
EDB - 1,2-Dibromoethane
DCA - 1,2-Dichloroethane
NS- Not Sampled
LNAPL - light non-aqueous phase liquid

FIGURE 7. MW-13R
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

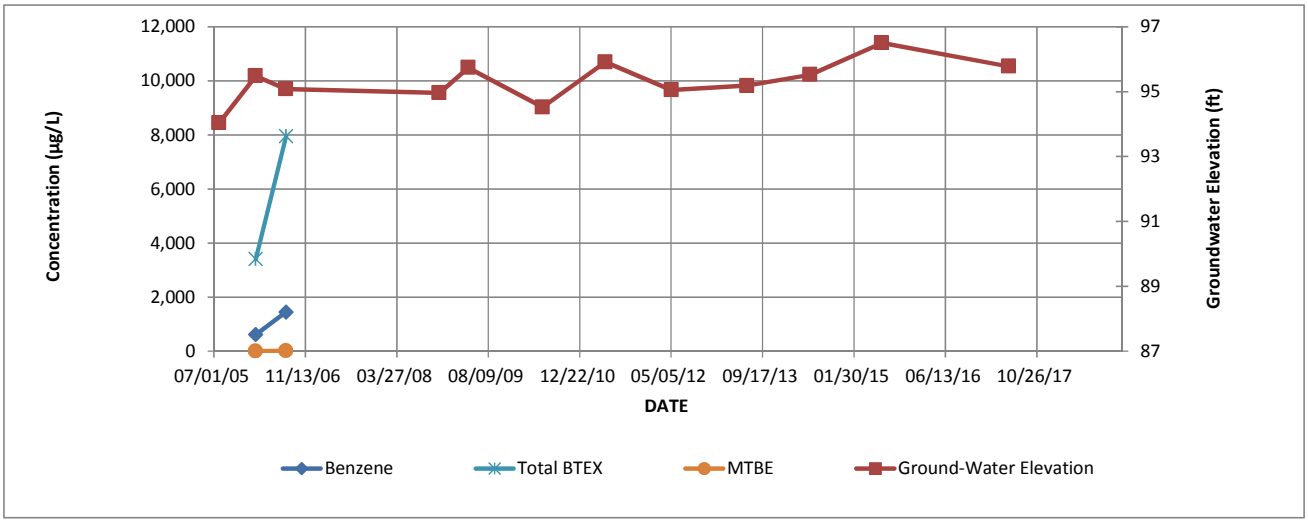


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**60.2**	BRL<5.0	**29.0**	**198.1**	**287.3**	**154**	**448**	**103**	NA	NA	93.85
02/15/06	**1.0**	BRL<1.0	**2.7**	**10.2**	**13.9**	**18.1**	**39.6**	**8.0**	NA	NA	95.09
07/17/06	**104**	BRL<1.0	BRL<1.0	BRL<3.0	**104**	**133**	**1.1**	BRL<1.0	NA	NA	94.92
09/12/07	**58.0**	BRL<2.5	**12.6**	**41.6**	**112**	**44.4**	**108.5**	**36.8**	NA	NA	94.41
03/18/08	**12.7**	BRL<1.0	**1.4**	**2.4**	**16.5**	**35.2**	**2.9**	**1.0**	BRL<1.0	BRL<1.0	96.58
11/14/08	**22.1**	**3.1**	**31.8**	**34.9**	**91.9**	**111.0**	**103.9**	**11.6**	BRL<1.0	BRL<1.0	95.01
04/22/09	**12.4**	**2.8**	**20.7**	**89.1**	**125.0**	**66.5**	**160.1**	**24.9**	BRL<1.0	BRL<1.0	95.84
06/02/10	**23.6**	**5.5**	**37.4**	**145.3**	**212**	**123**	**241.6**	**44.6**	BRL<2.5	BRL<5.0	94.61
05/11/11	**26**	**7.6**	**102**	**360.8**	**496.4**	**29.5**	**374.5**	**142**	BRL<2.5	BRL<5.0	95.90
05/07/12	**37.1**	BRL<10.0	**65.2**	**169**	**271**	**137**	**208.1**	**75.4**	BRL<5.0	BRL<10.0	95.05
06/24/13	**40.4**	**11.9**	**68.9**	**183.7**	**304.9**	**150**	**293.2**	**123**	BRL<2.5	BRL<5.0	95.05
05/19/14	**18.2**	BRL<5.0	**60.6**	**73.1**	**151.9**	**56.6**	**84.6**	**31.8**	BRL<2.5	BRL<5.0	95.96
06/05/15	**22.5**	**1.5**	**68.4**	**42.5**	**134.9**	**56.4**	**40.5**	**8.0**	BRL<0.5	BRL<1.0	95.71
05/26/17	**27.3**	**5.2**	**80.3**	**132**	**245**	**11.7**	**188**	**21.7**	BRL<0.5	BRL<1.0	95.66
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
Well destroyed and not sampled on 2/22/07; MW-13R replaced on 8/27/07.
EDB - 1,2-Dibromoethane
DCA - 1,2-Dichloroethane

FIGURE 8. MW-17
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

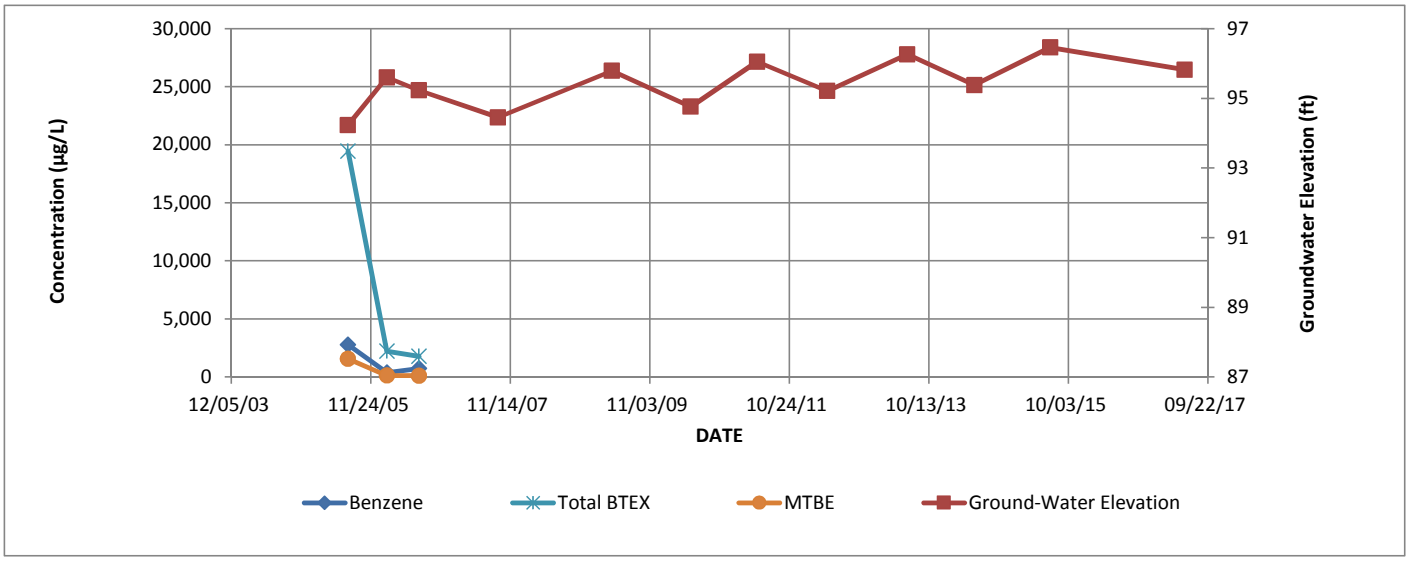


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.03
02/15/06	**614**	**543**	**309**	**1,940**	**3,406**	BRL<10.0	**1,046**	**188**	NA	NA	95.48
07/31/06	**1,450**	**549**	**2,110**	**3,852**	**7,961**	**14.0**	**1,061**	**364**	NA	NA	95.08
11/14/08	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.96
04/22/09	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.74
06/02/10	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.52
05/11/11	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.91
05/07/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.05
06/24/13	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.18
06/05/14	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.52
07/02/15	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.50
05/26/17	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.78
VGES	*5*	*1,000*	*700*	*10,000*	*--*	*40*	***350*	*20*	*0.05*	*5*	*--*

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NA - Not Analyzed
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
MW-17 could not be located in 2007/early 2008.
** Effective on 2/28/07, TMB enforcement standards increased to 350 µg/L total 1,2,4,TMB and 1,3,5,TMB
*Effective 05/03/07, EDB & 1,2 DCA were added to the list of chemicals analyzed for an 8021B VT Scan
EDB - 1,2-Dibromoethane
DCA - Dichloroethane
LNAPL -Light non-aqueous phase liquid
NS - not sampled

FIGURE 9. MW-18
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

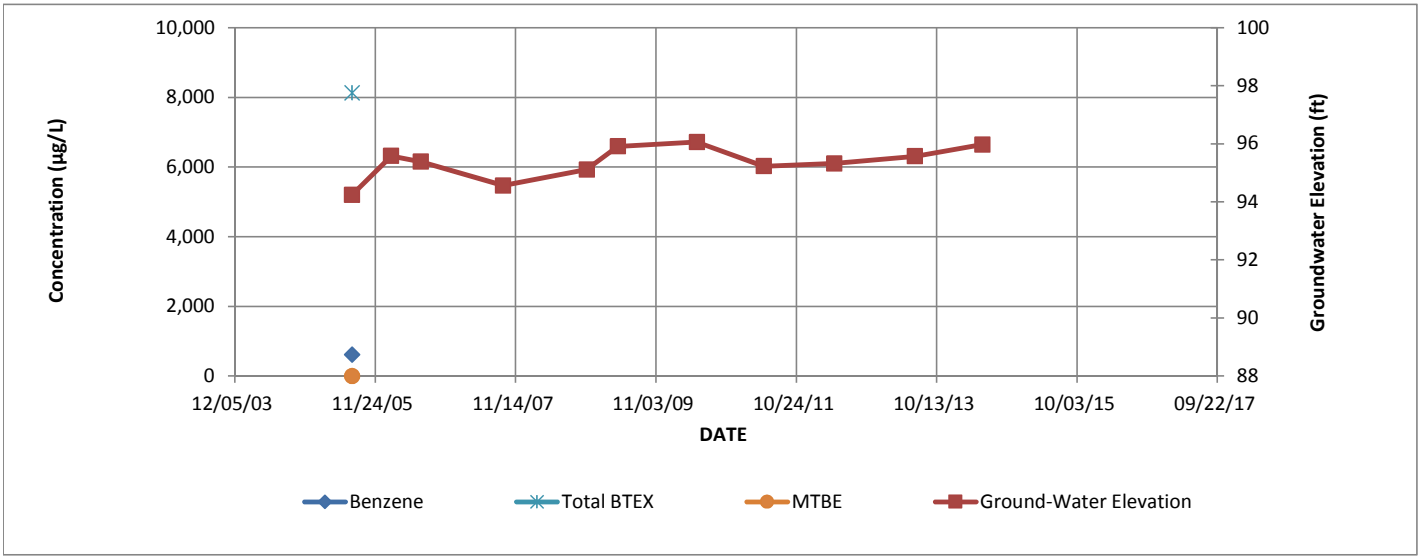


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**2,770**	**6,290**	**1,310**	**9,070**	**19,440**	**1,570**	**4,135**	**824**	NA	NA	94.23
02/15/06	**373**	**601**	**141**	**1,098**	**2,213**	**130**	**449**	**52.4**	NA	NA	95.60
07/31/06	**728**	**150**	**125**	**768.8**	**1,772**	**108**	**347.6**	**87.8**	NA	NA	95.23
09/12/07	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.45
04/22/09	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.79
06/02/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	94.76
05/11/11	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.05
05/07/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.21
06/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	96.26
06/05/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.38
07/02/15	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.46
05/26/17	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.82
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	***350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
** Effective on 2/28/07, TMB enforcement standards increased to 350 µg/L total 1,2,4,TMB and 1,3,5,TMB
*Effective 05/03/07, EDB & 1,2 DCA were added to the list of chemicals analyzed for an 8021B VT Scan
EDB - 1,2-Dibromoethane
DCA - Dichloroethane
LNAPL - light non-aqueous phase liquid

FIGURE 10. MW-22
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

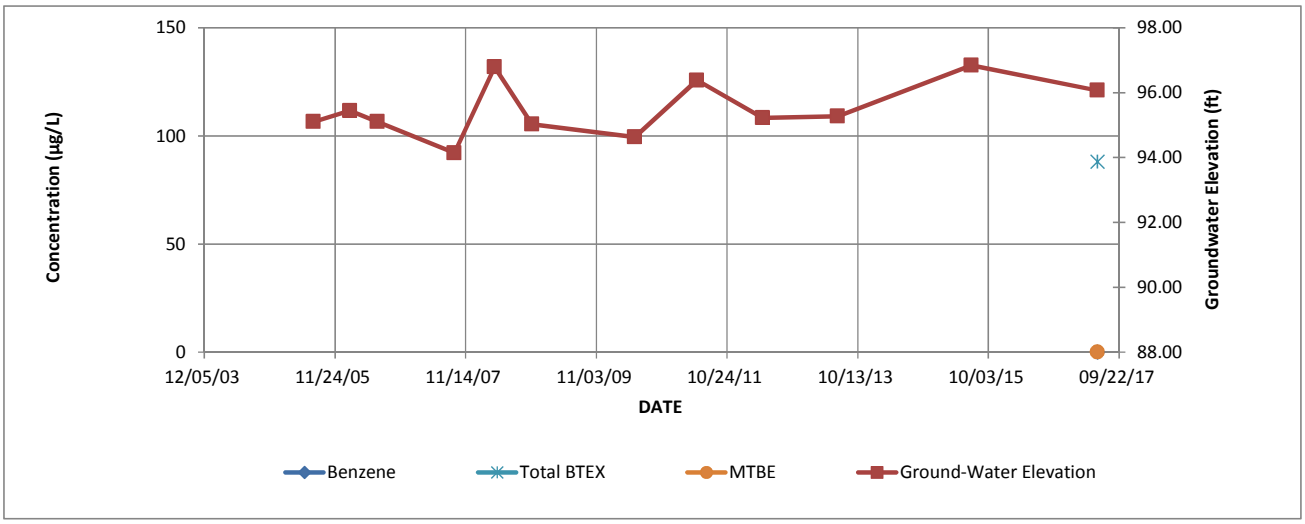


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**616**	**1,450**	**1,050**	**5,016**	**8,132**	BRL<50	**1,343**	**352**	NA	NA	94.24
02/14/06	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	NA	NA	95.58
07/17/06	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	NA	NA	95.38
09/12/07	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	NA	NA	94.56
11/14/08	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.11
04/22/09	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.91
06/02/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
05/11/11	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.06
05/07/12	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.23
06/24/13	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.32
06/05/14	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.57
07/02/15	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.57
05/26/17	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.97
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
LNAPL - Not sampled due to light non-aqueous phase liquid in well
EDB - 1,2-Dibromoethane
DCA - Dichloroethane
NS - not sampled
Well not sampled 6/2/10 - inaccessible due to tanks over well

FIGURE 11. MW-28
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

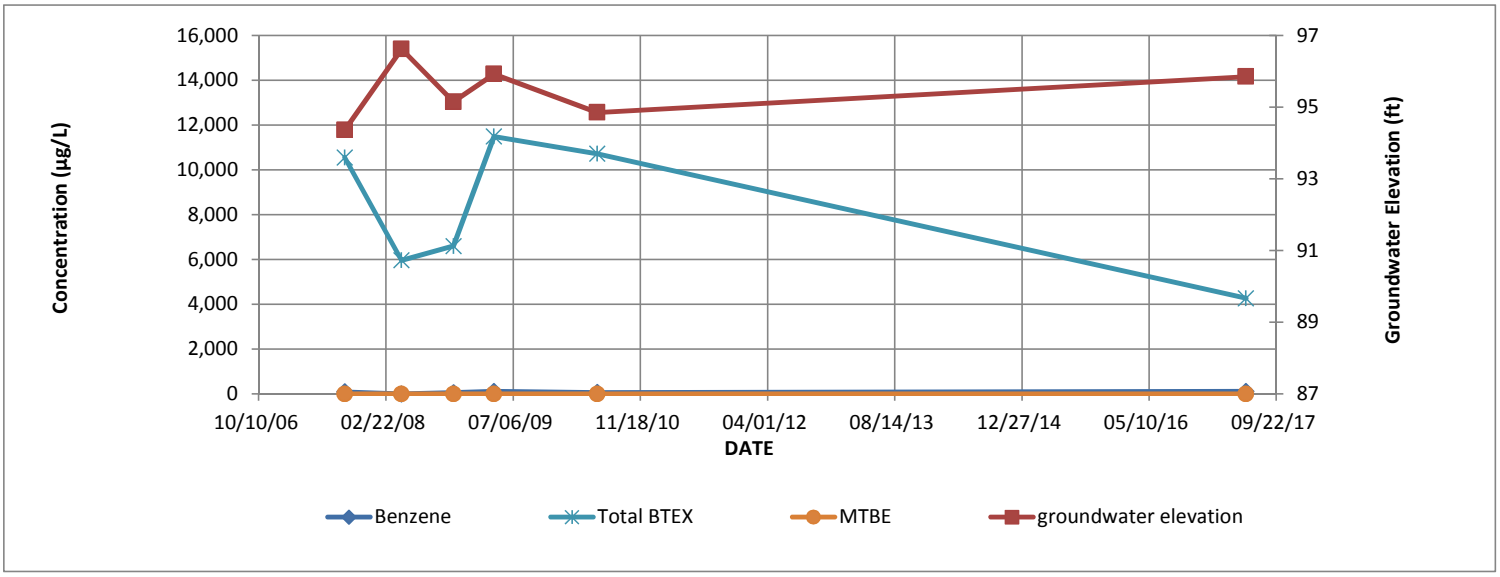


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
07/29/05	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.10
02/14/06	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.44
07/17/06	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.10
09/12/07	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	94.14
04/22/08	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.79
11/14/08	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.02
06/02/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	94.63
05/11/11	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.38
05/07/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.22
06/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.27
05/19/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
07/02/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	96.84
05/26/17	BRL<1.0	BRL<1.0	BRL<1.0	**88.1**	**88.1**	BRL<1.0	**137**	**9.2**	BRL<0.5	BRL<1.0	96.07
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	***350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
LNAPL - Not sampled due to light non-aqueous phase liquid in well
** Effective on 2/28/07, TMB enforcement standards increased to 350 µg/L total 1,2,4,TMB and 1,3,5,TMB
*Effective 05/03/07, EDB & 1,2 DCA were added to the list of chemicals analyzed for an 8021B VT Scan
EDB - 1,2-Dibromoethane
DCA - Dichloroethane
NS - Not Sampled

FIGURE 12. MW- 37
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

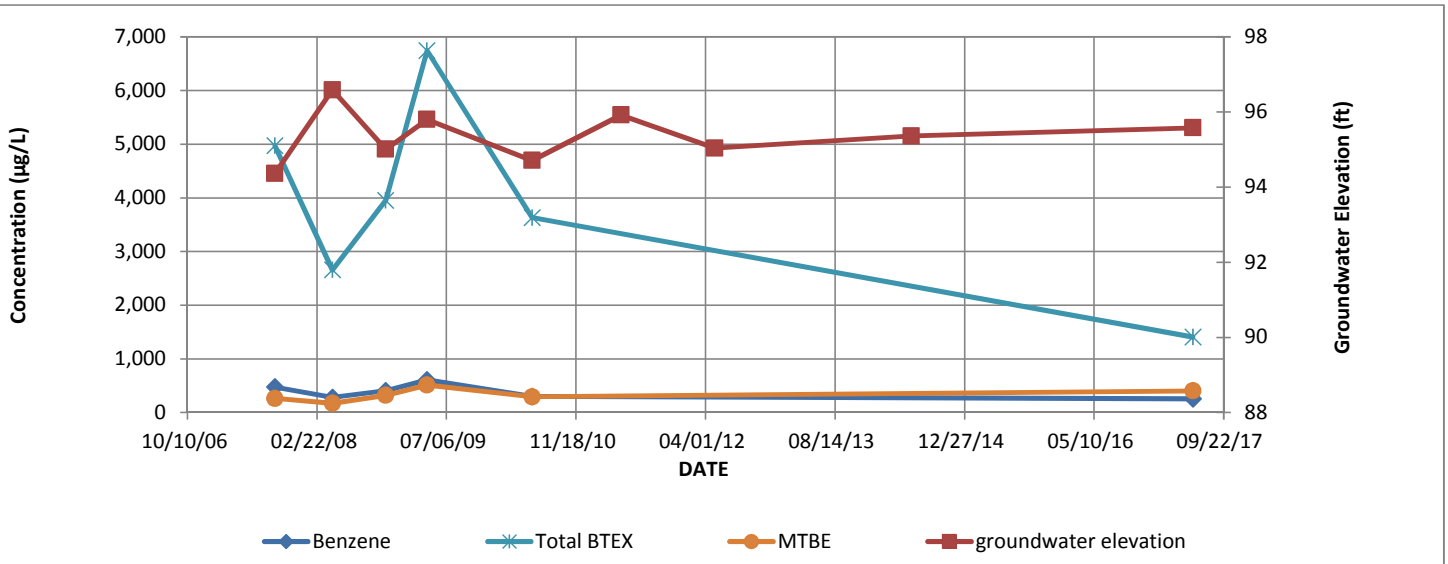


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
09/13/07	**90.0**	**128**	**1,850**	**8,488**	**10,556**	BRL<50.0	**2,730**	**770**	NA	NA	94.36
04/23/08	BRL<50.0	**50.5**	**1,020**	**4,889**	**5,960**	BRL<50.0	**1,878**	**276**	BRL<50.0	BRL<50.0	96.62
11/14/08	**53.8**	**62.8**	**1130**	**5351**	**6,598**	BRL<25.0	**1792**	**548**	BRL<25.0	BRL<25.0	95.15
04/22/09	**108**	**98.5**	**2,150**	**9,133**	**11,490**	BRL<25.0	**3,504**	**681**	BRL<25.0	BRL<25.0	95.92
06/02/10	**64.0**	**69.5**	**1,960**	**8,626**	**10,720**	BRL<50.0	**3,372**	**722**	BRL<25.0	BRL<50.0	94.85
05/11/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
05/07/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
06/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
05/19/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
05/26/17	**108**	**79.5**	**1,400**	**2,679**	**4,267**	BRL<50.0	**2,600**	**634**	BRL<25.0	BRL<50.0	95.85
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
Well could not be located on 2/14/06 and 2/22/07; likely due to snowpack
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
EDB - 1,2-Dibromoethane
DCA - Dichloroethane

FIGURE 13. MW- 38
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

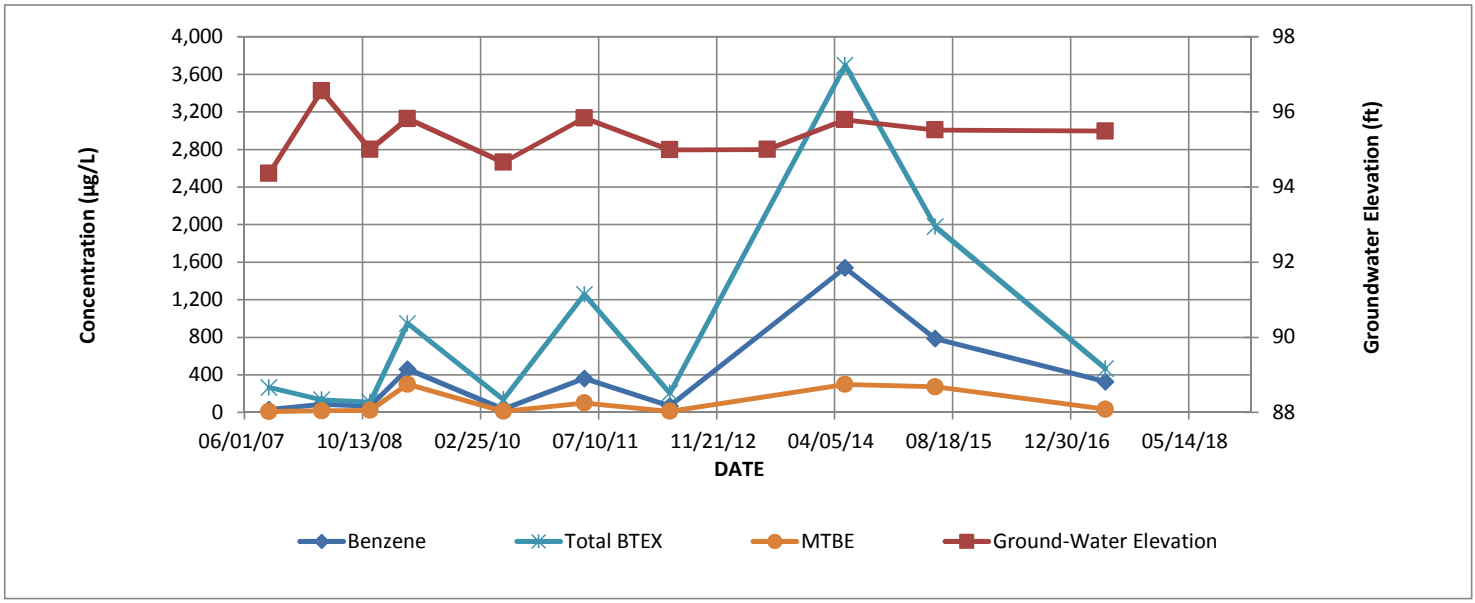


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
09/13/07	**474.0**	**51.5**	**908**	**3,537**	**4,971**	**264.0**	**1,051**	**343**	NA	NA	94.36
04/22/08	**281**	BRL<25.0	**615**	**1,760**	**2,656**	**171**	**831**	161	BRL<25.0	BRL<25.0	96.59
11/14/08	**406**	**35.0**	**889**	**2,624**	**3,954**	**320**	**1168**	**319**	BRL<25.0	BRL<25.0	95.01
04/22/09	**608**	**37.2**	**1,510**	**4,590**	**6,745**	**512**	**1,592**	**379**	BRL<25.0	BRL<25.0	95.80
06/02/10	**298**	BRL<50.0	**834**	**2,500**	**3,632**	**292**	**1,071**	**201**	BRL<25.0	BRL<50.0	94.71
05/11/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.92
05/07/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.04
06/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
06/05/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.36
05/26/17	**256**	**14.7**	**483**	**653**	**1,407**	**403**	**653**	**240**	BRL<2.5	BRL<5.0	95.58
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
Well could not be located on 2/14/06 and 2/22/07; likely due to snowpack
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
EDB - 1,2-Dibromoethane
DCA - Dichloroethane

FIGURE 14. MW- 39
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

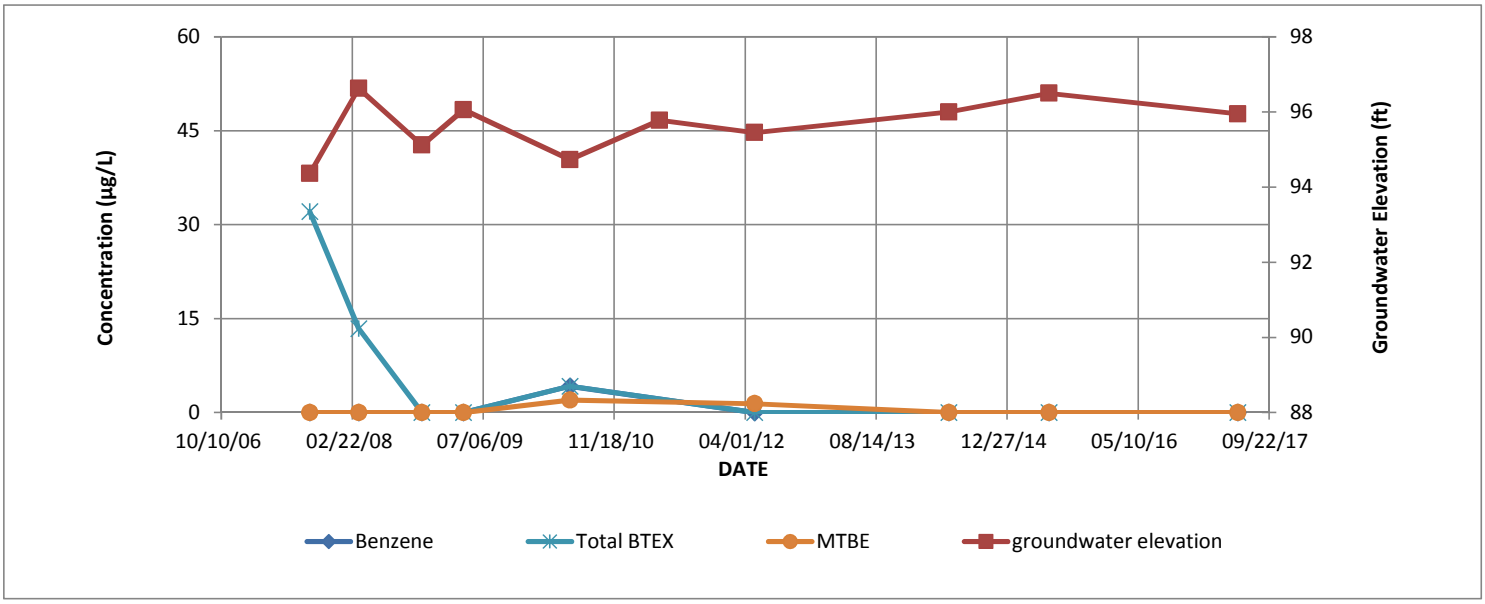


Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
09/13/07	**30.3**	**3**	**57**	**176**	**266**	**10.9**	**70**	**33**	NA	NA	94.36
04/23/08	**86.0**	BRL<1.0	**15.4**	**33.8**	**135**	**18.2**	**31.0**	**13.2**	BRL<1.0	BRL<1.0	96.56
11/14/08	**67.1**	BRL<1.0	**10.9**	**31**	**109**	**22.7**	**25.7**	**6.6**	BRL<1.0	BRL<1.0	95.00
04/22/09	**460**	**8.6**	**120**	**359**	**948**	**300**	**254.3**	**46.8**	BRL<5.0	BRL<5.0	95.82
06/02/10	**35.5**	BRL<5.0	**30.8**	**71.8**	**138**	**11.8**	**46.6**	**12.1**	BRL<2.5	BRL<5.0	94.66
05/11/11	**362**	**9.0**	**212**	**672.8**	**1,256**	**101**	**752**	**131**	BRL<2.5	BRL<5.0	95.84
05/07/12	**69**	BRL<5.0	**49.9**	**88.1**	**207**	**12.5**	**180.6**	**33.6**	BRL<2.5	BRL<5.0	94.99
06/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	95.00
05/19/14	**1,540**	**31.8**	**462**	**1,661.8**	**3,696**	**298**	**864**	**135**	BRL<12.5	BRL<25.0	95.79
06/05/15	**786**	BRL<25.0	**269**	**923**	**1,978**	**272**	**540**	**113**	BRL<12.5	BRL<25.0	95.52
05/26/17	**327**	**1.8**	**35.1**	**102.5**	**466**	**33.8**	**61.4**	**19.5**	BRL<0.5	BRL<1.0	95.49
VGES	*5*	*1,000*	*700*	*10,000*	--	*40*	*350*	*20*	*0.05*	*5*	--

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
Well could not be located on 2/14/06 and 2/22/07; likely due to snowpack
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
EDB - 1,2-Dibromoethane
DCA - 1,2-Dichloroethane

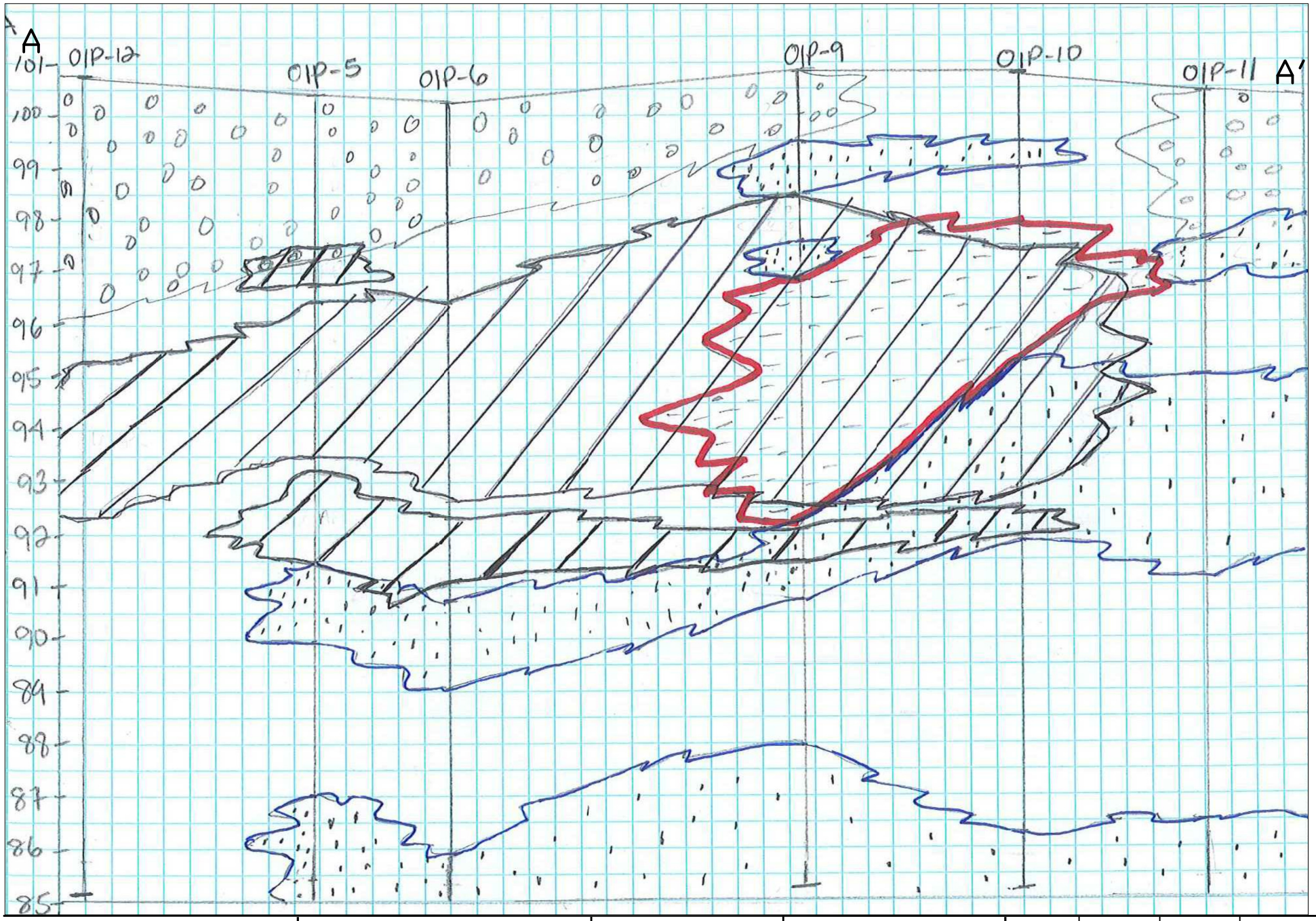
FIGURE 15. MW- 40
VOC Concentrations

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT



Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	TMBs	Naph-thalene	EDB	1,2 DCA	Ground-Water Elevation
09/13/07	BRL<1.0	BRL<1.0	**5**	**27**	**32.1**	BRL<1.0	**124**	**25**	NA	NA	94.36
03/18/08	BRL<1.0	BRL<1.0	**2.0**	**11.4**	**13.4**	BRL<1.0	**80.9**	**25.2**	BRL<1.0	BRL<1.0	96.63
11/14/08	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.12
04/22/09	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	**15.1**	**3.5**	BRL<1.0	BRL<1.0	96.06
06/02/10	**4.2**	BRL<1.0	BRL<1.0	BRL<3.0	**4.2**	**2.0**	BRL<2.0	BRL<1.0	BRL<0.5	BRL<1.0	94.73
05/11/11	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	95.78
05/07/12	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	**1.4**	BRL<2.0	**1.6**	BRL<0.5	BRL<1.0	95.45
06/24/13	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	**LNAPL**	96.00
05/19/14	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	BRL<2.0	BRL<2.0	BRL<0.5	BRL<1.0	96.50
06/05/15	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	BRL<2.0	BRL<1.0	BRL<0.5	BRL<1.0	95.95
05/26/17	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	BRL<2.0	BRL<1.0	BRL<0.5	BRL<1.0	97.36
VGES	*5*	*1,000*	*700*	*10,000*	*--*	*40*	***350*	*20*	*0.05*	*5*	*--*

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMBs - trimethyl benzenes
BRL - Below Reporting Limit
NS - Not Sampled
Well could not be located on 2/14/06 and 2/22/07; likely due to snowpack
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
** Effective on 2/28/07, TMB enforcement standards increased to 350 µg/L total 1,2,4,TMB and 1,3,5,TMB
*Effective 05/03/07, EDB & 1,2 DCA were added to the list of chemicals analyzed for an 8021B VT Scan
EDB - 1,2-Dibromoethane
DCA - 1,2-Dichloroethane
LNAPL - Light non-aqueous phase liquid detected in well



ATC
1 Elm Street, Suite 3 * Waterbury, VT 05676
Phone: 802-241-4131 Fax: 802-244-6894
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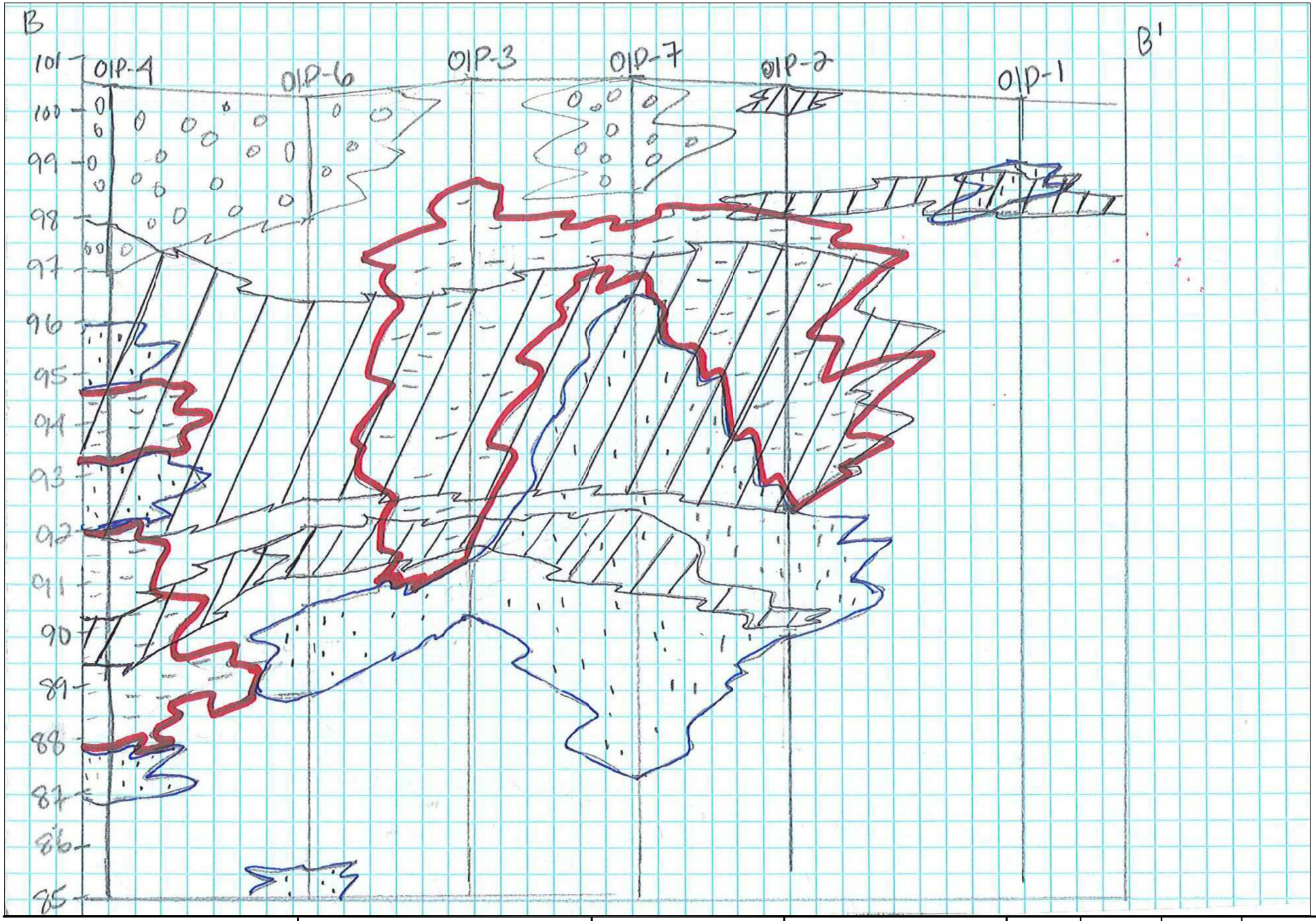
LNAPL
SAND/COARSE SAND
GRAVEL
SILT
CLAY
SOIL BORING

HORIZONTAL SCALE
0 10 20
1"=20'

PROJECT:
NORTHERN PETROLEUM
BULK STORAGE FACILITY
521 BAY STREET
ST. JOHNSBURY, VT

TITLE:
CROSS SECTION A - A'

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
AC	KM	KM	JH
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
NOTED	6/28/17	08204262	16



ATC
1 Elm Street, Suite 3 * Waterbury, VT 05676
Phone: 802-241-4131 Fax: 802-244-6694
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LNAPL | SAND/COARSE SAND | GRAVEL | SILT | CLAY | SOIL BORING

HORIZONTAL SCALE
0 10 20
1"=20'

PROJECT: NORTHERN PETROLEUM BULK STORAGE FACILITY 521 BAY STREET ST. JOHNSBURY, VT

TITLE: CROSS SECTION B - B'

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
AC	KM	KM	JH
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
NOTED	6/28/17	08204262	17

TABLES

Table 1a.
Groundwater Elevations

521 Bay Street
St. Johnsbury, VT

Monitoring Dates: 4 May 2017

Well I.D.	Top of Casing Elevation	Depth to LNAPL	Depth to Water	LNAPL Thickness	Corrected Depth to Water	Water Table Elevation	PID (ppm)
MW-1R	--	--	3.50	--	--	--	0.0
MW-2 (existing)	100.14	--	3.33	--	--	96.81	0.0
MW-4R	99.12	--	3.26	--	--	95.86	0.0
MW-5	98.95	--	3.07	--	--	95.88	0.0
MW-7	100.50	--	NM	--	--	--	--
MW-8	100.67	--	NM	--	--	--	--
MW-12R	98.73	--	2.07	--	--	96.66	3.7
MW-13R	98.76	--	2.39	--	--	96.37	17.4
MW-16	99.56	--	3.60	--	--	95.96	5.5
MW-17	99.83	3.43	4.01	0.58	3.49	96.34	218.7
MW-18	99.96	3.55	3.87	0.32	3.58	96.37	150
MW-19	100.05	--	2.76	--	--	97.29	2.5
MW-22	99.95	3.37	4.67	1.30	3.50	96.45	197.8
MW-28	102.09	--	5.43	--	--	96.66	0.0
MW-30	100.01	--	NM	--	--	--	--
MW-31	99.95	--	NM	--	--	--	--
MW-36	98.72	--	2.10	--	--	96.62	0.0
MW-37	99.67	--	3.24	--	--	96.43	246.7
MW-38	100.06	--	3.90	--	--	96.16	94.4
MW-39	99.74	--	3.65	--	--	96.09	131.6
MW-40	98.68	--	1.72	--	--	96.96	0.7
MW-101 (existing)	--	--	3.29	--	--	--	NM
MW-102	--	--	3.05	--	--	--	0.0
EX-1	98.80	--	--	--	--	--	--
EX-2	98.52	--	--	--	--	--	--
EX-3	98.48	--	--	--	--	--	--
EX-4	98.94	--	--	--	--	--	--
EX-5	99.07	--	--	--	--	--	--

Notes:

All values reported in feet relative to a datum of 100.00 ft.

NM - Not Measured

Corrected groundwater elevations were calculated by multiplying the LNAPL thickness by the specific gravity of #2 fuel oil (0.9) and subtracting the result from the measured depth to water.

LNAPL - light non-aqueous phase liquid

ppm- parts per million

Table 1b.
Groundwater Elevations

521 Bay Street
St. Johnsbury, VT

Monitoring Dates: 26 May 2017

Well I.D.	Top of Casing Elevation	Depth to LNAPL	Depth to Water	LNAPL Thickness	Corrected Depth to Water	Water Table Elevation
MW-1R	--	--	--	--	--	--
MW-2 (existing)	100.14		3.88			96.26
MW-4R	99.12	--	--	--	--	--
MW-5	98.95		4.01			94.94
MW-7	100.50	--	--	--	--	--
MW-8	100.67	--	--	--	--	--
MW-12R	98.73	--	--	--	--	--
MW-13R	98.76	--	3.10	--	--	95.66
MW-16	99.56	--	--	--	--	--
MW-17	99.83	4.00	4.41	0.41	4.04	95.78
MW-18	99.96	4.10	4.46	0.36	4.14	95.82
MW-19	100.05	--	--	--	--	--
MW-22	99.95	3.96	4.12	0.16	3.98	95.97
MW-28	102.09	--	6.02	--	--	96.07
MW-30	100.01	--	--	--	--	--
MW-31	99.95	--	--	--	--	--
MW-36	98.72	--	--	--	--	--
MW-37	99.67	--	3.82	--	--	95.85
MW-38	100.06	--	4.48	--	--	95.58
MW-39	99.74	--	4.25	--	--	95.49
MW-40	98.68	--	1.32	--	--	97.36
MW-101 (existing)	--	--	--	--	--	--
MW-102	--	--	--	--	--	--
EX-1	98.80	--	--	--	--	--
EX-2	98.52	--	--	--	--	--
EX-3	98.48	--	--	--	--	--
EX-4	98.94	--	--	--	--	--
EX-5	99.07	--	--	--	--	--

Notes:

All values reported in feet relative to a datum of 100.00 ft.

NM - Not Measured

Corrected groundwater elevations were calculated by multiplying the LNAPL thickness by the specific gravity of #2 fuel oil (0.9) and subtracting the result from the measured depth to water.

LNAPL - light non-aqueous phase liquid

Table 2.
Summary of Analytical Results

Northern Petroleum Bulk Plant
St. Johnsbury, Vermont

Monitoring Date: 26 May 2017

Well I.D.	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	Total TMB	Naphthalene	EDB	1,2 DCA
ONSITE MONITORING WELLS										
MW-5	**30.7**	BRL<1.0	BRL<1.0	BRL<3.0	**30.7**	**41.0**	**1.3**	**1.7**	BRL<0.5	BRL<1.0
MW-13R	**27.3**	**5.2**	**80.3**	**132**	**245**	**11.7**	**188**	**21.7**	BRL<0.5	BRL<1.0
MW-37	**108**	**79.5**	**1,400**	**2,679**	**4,267**	BRL<50.0	**2,600**	**634**	BRL<25.0	BRL<50.0
MW-38	**256**	**14.7**	**483**	**653**	**1,407**	**403**	**653**	**240**	BRL<2.5	BRL<5.0
MW-39	**327**	**1.8**	**35.1**	**102.5**	**466**	**33.8**	**61.4**	**19.5**	BRL<0.5	BRL<1.0
MW-40	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	BRL<2.0	BRL<1.0	BRL<0.5	BRL<1.0
OFFSITE MONITORING WELLS										
MW-2 (existing)	**118**	**29.0**	**121**	**352**	**620**	BRL<1.0	**254**	**70.5**	BRL<0.5	BRL<1.0
MW-28	BRL<1.0	BRL<1.0	BRL<1.0	**88.1**	**88.1**	BRL<1.0	**137**	**9.2**	BRL<0.5	BRL<1.0
QA/QC										
Duplicate (MW-39)	**323**	**1.9**	**39.8**	**114**	**478**	**27.7**	**71.0**	**22.1**	BRL<0.5	BRL<1.0
RPD (%)	1%	5%	13%	10%	--	20%	15%	13%	--	--
Trip Blank	BRL<1.0	BRL<1.0	BRL<1.0	BRL<3.0	BRL	BRL<1.0	BRL<2.0	BRL<1.0	BRL<0.5	BRL<1.0
VGES	***5***	***1,000***	***700***	***10,000***	***--***	***40***	***350***	***20***	***0.05***	***5***

Notes:

Results given in micrograms per liter (µg/L).

BTEX - a sum of benzene, toluene, ethylbenzene, and total xylenes

MTBE - methyl tert-butyl ether

TMB - trimethylbenzene

BRL - Below Reporting Limit

VGES - Vermont Groundwater Enforcement Standards, shaded area denotes exceedence of VGES

All samples collected by ATC and analyzed by Eurofins Spectrum Analytical, Inc.

EDB - 1,2-Dibromoethane

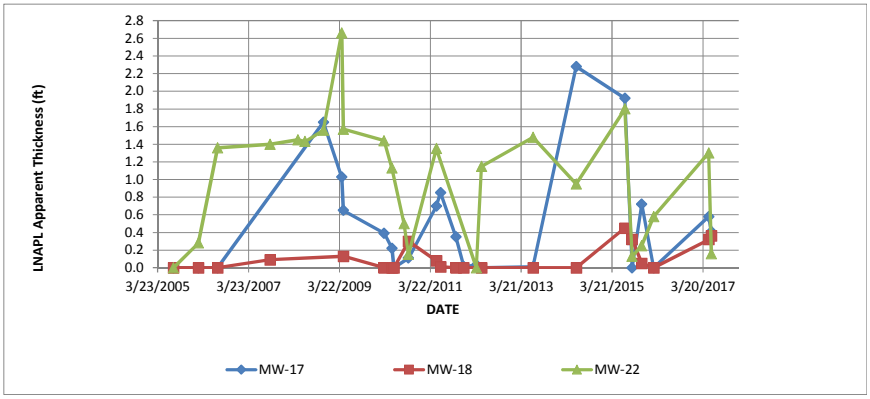
DCA - 1,2-Dichloroethane

QA/QC= Quality Assurance/Quality Control

Table 3.
LNAPL Product Thicknesses

521 Bay Street
St. Johnsbury, VT

08-204262.00



Monitoring Date	MW-1	MW-5	MW-7	MW-12R*	MW-17	MW-18	MW-19	MW-22	MW-28	MW-40
7/29/2005	ND	ND	**0.55**	ND	**~0.04**	ND	**~0.04**	ND	NM	
10/19/2005	NM	NM	NM	NM	NM	NM	NM	NM	**0.27**	
2/14/2006	ND	ND	**0.16**	**0.37**	ND	ND	ND	**0.28**	**0.45**	
7/17/2006	ND	ND	**0.13**	**0.20**	ND	ND	ND	**1.36**	**0.64**	
2/22/2007	NM	ND	ND	**~0.08**	NM	NM	NM	NM	NM	
9/12/2007	CNL	**0.20**	**0.10**	ND	CNL	**0.09**	ND	**1.40**	**0.79**	ND
12/19/2007	NM	**0.02**	ND	NM	NM	NM	NM	NM	NM	NM
4/22/2008	ND	**0.04**	**0.03**	ND	CNL	CNL	NM	**1.45**	**0.14**	ND
6/18/2008	NM	**0.05**	**0.03**	ND	NM	NM	NM	**1.43**	NM	ND
11/13/2008	**0.03**	**0.05**	ND	ND	**1.65**	NM	ND	**1.56**	**0.08**	**0.04**
4/9/2009	NM	ND	ND	ND	**1.03**	NM	NM	**2.66**	**0.01**	NM
4/22/2009	ND	**0.03**	ND	ND	**0.65**	**0.13**	ND	**1.57**	ND	ND
7/29/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/11/2009	NM	**0.14**	NM	NM	NM	NM	NM	NM	**0.60**	NM
10/22/2009	NM	NM	NM	NM	NM	NM	NM	NM	**0.80**	NM
11/9/2009	NM	NM	NM	NM	NM	NM	NM	NM	**0.30**	NM
12/28/2009	NM	NM	NM	NM	NM	NM	NM	NM	**0.05**	NM
3/16/2010	NM	**0.10**	**sheen**	ND	**0.39**	ND	ND	**1.44**	**sheen**	ND
5/18/2010	NM	**0.01**	ND	ND	**0.22**	ND	NM	**1.13**	**sheen**	ND
6/2/2010	CNL	**0.10**	ND	ND	ND	ND	NM	NM	ND	ND
7/13/2010	CNL	**0.05**	ND	NM	CNL	CNL	ND	NM	**0.20**	ND
8/23/2010	CNL	**0.04**	**0.01**	NM	NM	CNL	NM	**0.50**	**0.30**	ND
9/27/2010	CNL	**0.05**	**0.03**	ND	**0.11**	**0.30**	ND	**0.15**	**0.40**	**0.01**
11/4/2010	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/16/2010	NM	NM	ND	NM	NM	NM	NM	NM	**0.02**	NM
3/29/2011	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/29/2011	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2011	CNL	ND	ND	ND	**0.70**	**0.08**	ND	**1.35**	**0.01**	**0.06**
6/13/2011	CNL	ND	**0.41**	ND	**0.85**	**0.01**	ND	NM	ND	ND
7/15/2011	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/14/2011	NM	ND	**0.01**	NM	**0.35**	ND	ND	NM	ND	NM
12/16/2011	CNL	ND	**0.01**	ND	**0.02**	ND	**0.01**	NM	ND	NM
3/27/2012	CNL	ND	**0.01**	ND	**0.03**	CNL	ND	ND	CNL	ND
5/7/2012	CNL	ND	**0.01**	ND	ND	ND	ND	**1.15**	ND	ND
6/24/2013	CNL	ND	ND	ND	**0.01**	ND	NM	**1.48**	ND	**0.02**
6/5/2014	CNL	ND	ND	ND	**2.28**	ND	ND	**0.95**	NM	ND
6/5/2015	NM	ND	ND	ND	NM	NM	NM	NM	NM	NM
7/2/2015	CNL	NM	NM	NM	**1.92**	**0.45**	CNL	**1.80**	ND	NM
8/28/2015	NM	NM	NM	NM	ND	**0.32**	NM	**0.13**	ND	ND
11/13/2015	NM	NM	NM	NM	**0.72**	**0.05**	NM	**0.25**	ND	ND
2/17/2016	NM	NM	NM	NM	ND	ND	NM	**0.58**	ND	NM
5/4/2017	ND	ND	ND	ND	**0.58**	**0.32**	ND	**1.30**	ND	ND
5/26/2017	ND	ND	ND	ND	**0.41**	**0.36**	ND	**0.16**	ND	ND

Notes:
ND - LNAPL not detected in well.
NM - Not measured
CNL - Could not locate the well
*MW-12 replaced in August 2007 with MW-12R
LNAPL - light non-aqueous phase liquid

Table 4.
Total LNAPL Recovered (Gallons)

521 Bay Street
St. Johnsbury, VT

08-204262.00

Monitoring Date	MW-22	MW-17	MW-18	Total LNAPL recovered (gallons)	EX-1	EX-2	EX-3	EX-4	EX-5
12/19/2007	NM	--	--	0.00	NM	NM	NM	ND	0.00
4/23/2008	0.09	--	--	0.09	ND	ND	ND	1.00	0.03
6/18/2008	0.08	--	--	0.08	ND	ND	ND	1.00	0.13
7/16/2008	NM	--	--	0.00	ND	0.00	ND	0.15	0.40
8/27/2008	NM	--	--	0.00	ND	ND	ND	0.01	0.01
10/31/2008	NM	--	--	0.00	ND	ND	ND	0.80	0.80
11/13/2008	0.00	--	--	0.00	ND	0.01	ND	0.80	0.07
12/19/2008	NM	--	--	0.00	ND	0.07	NM	0.00	0.53
2/3/2009	NM	--	--	0.00	NM	NM	NM	0.13	0.00
2/24/2009	NM	--	--	0.00	NM	NM	NM	0.01	NM
3/20/2009	ND	--	--	0.00	ND	0.00	ND	0.26	0.00
4/9/2009	0.15	--	--	0.15	ND	ND	ND	0.25	ND
5/6/2009	MN	--	--	0.00	ND	sheen	sheen	0.80	0.00
6/29/2009	NM	--	--	0.00	NM	NM	NM	0.40	0.01
7/29/2009	NM	--	--	0.00	0.00	0.00	0.00	0.10	0.00
9/11/2009	NM	--	--	0.00	ND	0.13	sheen	sheen	0.10
10/22/2009	NM	--	--	0.00	0.00	0.03	0.00	0.13	0.07
11/9/2010	NM	--	--	0.00	ND	0.00	ND	0.25	0.33
12/28/2009	NM	--	--	0.00	NM	0.00	NM	0.00	0.00
3/17/2010	0.08	--	--	0.08	ND	ND	ND	NM	0.00
5/18/2010	0.00	--	--	0.00	ND	0.03	ND	0.03	0.40
6/2/2010	NM	--	--	0.00	ND	0.00	ND	0.53	0.39
7/13/2010	NM	--	--	0.00	NM	0.00	ND	0.25	0.06
8/23/2010	0.01	--	--	0.01	NM	0.01	NM	0.02	0.05
9/27/2010	0.00	--	--	0.00	NM	1.00	ND	0.50	0.00
11/4/2010	NM	--	--	0.00	NM	ND	NM	ND	0.25
12/16/2010	NM	--	--	0.00	NM	NM	NM	NM	NM
3/29/2011	NM	--	--	0.00	NM	NM	NM	NM	NM
4/29/2011	NM	--	--	0.15	NM	0.05	NM	0.05	0.05
5/11/2011	0.00	--	--	0.00	ND	0.05	NM	0.05	ND
6/13/2011	NM	--	--	0.00	ND	ND	NM	0.00	0.00
7/15/2011	NM	--	--	0.00	NM	0.10	NM	0.05	0.05
10/14/2011	NM	--	--	0.00	NM	0.00	NM	0.00	0.10
12/16/2011	NM	--	--	0.00	NM	0.00	NM	0.00	0.01
3/27/2012	NM	--	--	0.00	0.00	0.05	CNL	0.10	0.10
5/7/2012	0.05	--	--	0.05	ND	ND	ND	0.10	0.10
6/24/2013	0.06	--	--	0.06	ND	ND	NM	0.00	0.00
6/5/2014	0.50	0.50	--	1.00	**Total Recovered Gallons from EX wells**				
7/2/2015	1.00	1.25	0.13	2.38					
8/28/2015	0.22	--	0.11	0.33					
11/13/2015	0.06	0.13	0.06	0.25					
2/17/2016	0.13	--	--	0.13					
5/26/2017	0.03	0.03	0.02	0.08					
Total Recovered Gallons from MWs				**4.82**					

Notes:

ND - LNAPL product not detected in well.

NM - Not measured

LNAPL- light non-aqueous phase liquid

-- - data not recorded

APPENDIX A

LABORATORY ANALYTICAL REPORT

eurofins | Spectrum Analytical

☑ Final Report
☐ Revised Report

Report Date:
12-Jun-17 10:25

Laboratory Report
SC35268

ATC Group Services, LLC
1 Elm St. Suite 3
Waterbury, VT 05676
Attn: Katrina Mattice

Project: Northern Petroleum-St Johnsbury, VT
Project #: 08-204262.02

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393

Authorized by:

Christina White
Laboratory Director

Eurofins Spectrum Analytical holds primary NELAC certification in the State of New York for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of New York does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.
Please note that this report contains 28 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

Eurofins Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Spectrum Analytical, Inc. is currently accredited for the specific method or analyte indicated. Please refer to our 'Quality' web page at www.spectrum-analytical.com for a full listing of our current certifications and fields of accreditation. States in which Eurofins Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey, Pennsylvania and Florida. All analytical work for Volatile Organic and Air analysis are transferred to and conducted at our 830 Silver Street location (PA-68-04426).

Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC35268

Project: Northern Petroleum-St Johnsbury, VT

Project Number: 08-204262.02

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SC35268-01	Trip Blank	Deionized Water	26-May-17 08:00	31-May-17 10:55
SC35268-02	Duplicate	Ground Water	26-May-17 00:00	31-May-17 10:55
SC35268-03	MW-5	Ground Water	26-May-17 09:52	31-May-17 10:55
SC35268-04	MW-13R	Ground Water	26-May-17 09:58	31-May-17 10:55
SC35268-05	MW-38	Ground Water	26-May-17 11:10	31-May-17 10:55
SC35268-06	MW-39	Ground Water	26-May-17 11:16	31-May-17 10:55
SC35268-07	MW-40	Ground Water	26-May-17 12:30	31-May-17 10:55
SC35268-08	MW-2	Ground Water	26-May-17 13:33	31-May-17 10:55
SC35268-09	MW-37	Ground Water	26-May-17 14:17	31-May-17 10:55
SC35268-10	MW-28	Ground Water	26-May-17 15:26	31-May-17 10:55

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 1.2 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

SW846 8260C

Calibration:

1705027

Analyte quantified by quadratic equation type calibration.

Naphthalene

This affected the following samples:

1709261-BLK1
1709261-BS1
1709261-BSD1
1709261-MS1
1709261-MSD1
Duplicate
MW-13R
MW-38
MW-39
MW-5
S704734-ICV1
S705051-CCV1

1705029

Analyte quantified by quadratic equation type calibration.

1,2-Dibromoethane (EDB)
Naphthalene

SW846 8260C

Calibration:

1705029

This affected the following samples:

1709333-BLK1
1709333-BS1
1709333-BSD1
1709410-BLK1
1709410-BS1
1709410-BSD1
1709410-MS1
1709410-MSD1
1709503-BLK1
1709503-BS1
1709503-BSD1
MW-2
MW-28
MW-37
MW-40
S704772-ICV1
S705083-CCV1
S705111-CCV1
S705157-CCV1
Trip Blank

Laboratory Control Samples:

1709333 BS

Methyl tert-butyl ether percent recovery 133 (70-130) is outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

MW-2
MW-28
MW-37

Spikes:

1709261-MS1 *Source: SC35268-05*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Methyl tert-butyl ether

This flag indicates the concentration for this analyte is an estimated value due to exceeding the calibration range or interferences resulting in a biased final concentration.

1,2,4-Trimethylbenzene
Ethylbenzene
m,p-Xylene
Methyl tert-butyl ether

1709261-MSD1 *Source: SC35268-05*

RPD out of acceptance range.

Naphthalene

SW846 8260C

Spikes:

1709261-MSD1 *Source: SC35268-05*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

1,2,4-Trimethylbenzene
m,p-Xylene
Methyl tert-butyl ether
Naphthalene

This flag indicates the concentration for this analyte is an estimated value due to exceeding the calibration range or interferences resulting in a biased final concentration.

1,2,4-Trimethylbenzene
Ethylbenzene
m,p-Xylene
Methyl tert-butyl ether

1709410-MS1 *Source: SC35268-08RE1*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Naphthalene

1709410-MSD1 *Source: SC35268-08RE1*

RPD out of acceptance range.

Naphthalene

The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

Methyl tert-butyl ether

Samples:

S705083-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Methyl tert-butyl ether (29.1%)

Analyte percent drift is outside individual acceptance criteria (20), but within overall method allowances.

Naphthalene (-36.7%)

This affected the following samples:

1709333-BLK1
1709333-BS1
1709333-BSD1
MW-2
MW-28
MW-37

S705157-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

1,2-Dichloroethane (20.7%)

SW846 8260C

Samples:

S705157-CCV1

This affected the following samples:

1709503-BLK1
1709503-BS1
1709503-BSD1
Trip Blank

SC35268-02RE1 *Duplicate*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-04RE1 *MW-13R*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-05 *MW-38*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-05RE1 *MW-38*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-06RE1 *MW-39*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-08RE1 *MW-2*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-09 *MW-37*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

SC35268-10RE1 *MW-28*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

Sample Acceptance Check Form

Client:	ATC Group Services, LLC - Waterbury, VT
Project:	Northern Petroleum-St Johnsbury, VT / 08-204262.02
Work Order:	SC35268
Sample(s) received on:	5/31/2017

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☑	☐	☐
Were custody seals intact?	☑	☐	☐
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples cooled on ice upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☑	☐	☐
Did sample container labels agree with Chain of Custody document?	☐	☑	☐
Were samples received within method-specific holding times?	☑	☐	☐

Summary of Hits

Lab ID: SC35268-02 **Client ID:** Duplicate

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	65.1		1.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	5.9		1.0	µg/l	SW846 8260C
Benzene	277	E	1.0	µg/l	SW846 8260C
Ethylbenzene	39.8		1.0	µg/l	SW846 8260C
m,p-Xylene	115	E	2.0	µg/l	SW846 8260C
Methyl tert-butyl ether	27.7		1.0	µg/l	SW846 8260C
Naphthalene	22.1		1.0	µg/l	SW846 8260C
o-Xylene	5.6		1.0	µg/l	SW846 8260C
Toluene	1.9		1.0	µg/l	SW846 8260C

Lab ID: SC35268-02RE1 **Client ID:** Duplicate

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Benzene	323	D	5.0	µg/l	SW846 8260C
m,p-Xylene	108	D	10.0	µg/l	SW846 8260C

Lab ID: SC35268-03 **Client ID:** MW-5

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	1.3		1.0	µg/l	SW846 8260C
Benzene	30.7		1.0	µg/l	SW846 8260C
Methyl tert-butyl ether	41.0		1.0	µg/l	SW846 8260C
Naphthalene	1.7		1.0	µg/l	SW846 8260C

Lab ID: SC35268-04 **Client ID:** MW-13R

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	168	E	1.0	µg/l	SW846 8260C
Benzene	27.3		1.0	µg/l	SW846 8260C
Ethylbenzene	80.3		1.0	µg/l	SW846 8260C
m,p-Xylene	106	E	2.0	µg/l	SW846 8260C
Methyl tert-butyl ether	11.7		1.0	µg/l	SW846 8260C
Naphthalene	21.7		1.0	µg/l	SW846 8260C
o-Xylene	15.3		1.0	µg/l	SW846 8260C
Toluene	5.2		1.0	µg/l	SW846 8260C

Lab ID: SC35268-04RE1 **Client ID:** MW-13R

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	188	D	5.0	µg/l	SW846 8260C
m,p-Xylene	117	D	10.0	µg/l	SW846 8260C

Lab ID: SC35268-05 **Client ID:** MW-38

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	643	D, E	5.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	53.8	D	5.0	µg/l	SW846 8260C
Benzene	256	D	5.0	µg/l	SW846 8260C
Ethylbenzene	562	D, E	5.0	µg/l	SW846 8260C
m,p-Xylene	709	D, E	10.0	µg/l	SW846 8260C
Methyl tert-butyl ether	510	D, E	5.0	µg/l	SW846 8260C
Naphthalene	240	D	5.0	µg/l	SW846 8260C
o-Xylene	26.8	D	5.0	µg/l	SW846 8260C
Toluene	14.7	D	5.0	µg/l	SW846 8260C

Lab ID: SC35268-05RE1 **Client ID:** MW-38

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	599	D	10.0	µg/l	SW846 8260C
Ethylbenzene	483	D	10.0	µg/l	SW846 8260C
m,p-Xylene	626	D	20.0	µg/l	SW846 8260C
Methyl tert-butyl ether	403	D	10.0	µg/l	SW846 8260C

Lab ID: SC35268-06 **Client ID:** MW-39

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	56.5		1.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	4.9		1.0	µg/l	SW846 8260C
Benzene	271	E	1.0	µg/l	SW846 8260C
Ethylbenzene	35.1		1.0	µg/l	SW846 8260C
m,p-Xylene	97.4		2.0	µg/l	SW846 8260C
Methyl tert-butyl ether	33.8		1.0	µg/l	SW846 8260C
Naphthalene	19.5		1.0	µg/l	SW846 8260C
o-Xylene	5.1		1.0	µg/l	SW846 8260C
Toluene	1.8		1.0	µg/l	SW846 8260C

Lab ID: SC35268-06RE1 **Client ID:** MW-39

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Benzene	327	D	5.0	µg/l	SW846 8260C

Lab ID: SC35268-08 **Client ID:** MW-2

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	213	E	1.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	51.8		1.0	µg/l	SW846 8260C
Benzene	124	E	1.0	µg/l	SW846 8260C
Ethylbenzene	127	E	1.0	µg/l	SW846 8260C
m,p-Xylene	328	E	2.0	µg/l	SW846 8260C
Naphthalene	70.5		1.0	µg/l	SW846 8260C
o-Xylene	10.7		1.0	µg/l	SW846 8260C
Toluene	29.0		1.0	µg/l	SW846 8260C

Lab ID: SC35268-08RE1 **Client ID:** MW-2

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	202	D	10.0	µg/l	SW846 8260C
Benzene	118	D	10.0	µg/l	SW846 8260C
Ethylbenzene	121	D	10.0	µg/l	SW846 8260C
m,p-Xylene	341	D	20.0	µg/l	SW846 8260C

Lab ID: SC35268-09 **Client ID:** MW-37

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	2430	D	50.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	170	D	50.0	µg/l	SW846 8260C
Benzene	108	D	50.0	µg/l	SW846 8260C
Ethylbenzene	1400	D	50.0	µg/l	SW846 8260C
m,p-Xylene	2560	D	100	µg/l	SW846 8260C
Naphthalene	634	D	50.0	µg/l	SW846 8260C
o-Xylene	119	D	50.0	µg/l	SW846 8260C
Toluene	79.5	D	50.0	µg/l	SW846 8260C

Lab ID: SC35268-10 **Client ID:** MW-28

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	112	E	1.0	µg/l	SW846 8260C
1,3,5-Trimethylbenzene	27.0		1.0	µg/l	SW846 8260C
m,p-Xylene	85.6		2.0	µg/l	SW846 8260C
Naphthalene	9.2		1.0	µg/l	SW846 8260C
o-Xylene	2.5		1.0	µg/l	SW846 8260C

Lab ID: SC35268-10RE1 **Client ID:** MW-28

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
1,2,4-Trimethylbenzene	110	D	5.0	µg/l	SW846 8260C

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Trip Blank SC35268-01	08-204262.02	Deionized Water	26-May-17 08:00	31-May-17

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	08-Jun-17	08-Jun-17	GMA	1709503	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 2.0		µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	< 1.0		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*102*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*107*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*100*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Duplicate SC35268-02	08-204262.02	Ground Water	26-May-17 00:00	31-May-17

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**277**	E	µg/l	1.0	0.3	1	SW846 8260C	05-Jun-17	06-Jun-17	MP	1709261	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	**39.8**		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	**27.7**		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**22.1**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	**1.9**		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**65.1**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**5.9**		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**115**	E	µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	**5.6**		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*99*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*96*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*99*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*101*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
71-43-2	Benzene	**323**	D	µg/l	5.0	1.4	5	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
179601-23-1	m,p-Xylene	**108**	D	µg/l	10.0	1.9	5	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*96*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-5	08-204262.02	Ground Water	26-May-17 09:52	31-May-17
SC35268-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**30.7**		µg/l	1.0	0.3	1	SW846 8260C	05-Jun-17	06-Jun-17	MP	1709261	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	**41.0**		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**1.7**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**1.3**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 2.0		µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	< 1.0		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*97*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*96*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*100*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*101*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-13R	08-204262.02	Ground Water	26-May-17 09:58	31-May-17
SC35268-04				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**27.3**		µg/l	1.0	0.3	1	SW846 8260C	05-Jun-17	06-Jun-17	MP	1709261	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	**80.3**		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	**11.7**		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**21.7**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	**5.2**		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**168**	E	µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**106**	E	µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	**15.3**		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*100*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*98*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*98*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*83*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
95-63-6	1,2,4-Trimethylbenzene	**188**	D	µg/l	5.0	1.3	5	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
179601-23-1	m,p-Xylene	**117**	D	µg/l	10.0	1.9	5	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*96*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-38	08-204262.02	Ground Water	26-May-17 11:10	31-May-17
SC35268-05				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
71-43-2	Benzene	**256**	D	µg/l	5.0	1.4	5	SW846 8260C	05-Jun-17	06-Jun-17	MP	1709261	X
106-93-4	1,2-Dibromoethane (EDB)	< 2.5	D	µg/l	2.5	1.3	5	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 5.0	D	µg/l	5.0	1.4	5	"	"	"	"	"	X
100-41-4	Ethylbenzene	**562**	D, E	µg/l	5.0	1.5	5	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	**510**	D, E	µg/l	5.0	1.4	5	"	"	"	"	"	X
91-20-3	Naphthalene	**240**	D	µg/l	5.0	1.7	5	"	"	"	"	"	X
108-88-3	Toluene	**14.7**	D	µg/l	5.0	1.4	5	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**643**	D, E	µg/l	5.0	1.3	5	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**53.8**	D	µg/l	5.0	1.3	5	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**709**	D, E	µg/l	10.0	1.9	5	"	"	"	"	"	X
95-47-6	o-Xylene	**26.8**	D	µg/l	5.0	2.4	5	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*98*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*98*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*97*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*100*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
100-41-4	Ethylbenzene	**483**	D	µg/l	10.0	3.0	10	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
1634-04-4	Methyl tert-butyl ether	**403**	D	µg/l	10.0	2.8	10	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**599**	D	µg/l	10.0	2.7	10	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**626**	D	µg/l	20.0	3.8	10	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*98*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-39	08-204262.02	Ground Water	26-May-17 11:16	31-May-17
SC35268-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**271**	E	µg/l	1.0	0.3	1	SW846 8260C	05-Jun-17	06-Jun-17	MP	1709261	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	**35.1**		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	**33.8**		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**19.5**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	**1.8**		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**56.5**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**4.9**		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**97.4**		µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	**5.1**		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*98*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*96*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*96*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*100*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
71-43-2	Benzene	**327**	D	µg/l	5.0	1.4	5	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*101*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*106*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*99*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-40	08-204262.02	Ground Water	26-May-17 12:30	31-May-17
SC35268-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 2.0		µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	< 1.0		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*100*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*97*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*101*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-2 SC35268-08	08-204262.02	Ground Water	26-May-17 13:33	31-May-17

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**124**	E	µg/l	1.0	0.3	1	SW846 8260C	06-Jun-17	06-Jun-17	GMA	1709333	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	**127**	E	µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**70.5**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	**29.0**		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**213**	E	µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**51.8**		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**328**	E	µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	**10.7**		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*99*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*97*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
71-43-2	Benzene	**118**	D	µg/l	10.0	2.8	10	SW846 8260C	07-Jun-17	07-Jun-17	GMA	1709410	X
100-41-4	Ethylbenzene	**121**	D	µg/l	10.0	3.0	10	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**202**	D	µg/l	10.0	2.7	10	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**341**	D	µg/l	20.0	3.8	10	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*97*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-37	08-204262.02	Ground Water	26-May-17 14:17	31-May-17
SC35268-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS			GS1										
Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	**108**	D	µg/l	50.0	14.2	50	SW846 8260C	06-Jun-17	06-Jun-17	GMA	1709333	X
106-93-4	1,2-Dibromoethane (EDB)	< 25.0	D	µg/l	25.0	13.4	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 50.0	D	µg/l	50.0	14.4	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	**1,400**	D	µg/l	50.0	15.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 50.0	D	µg/l	50.0	13.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	**634**	D	µg/l	50.0	17.3	50	"	"	"	"	"	X
108-88-3	Toluene	**79.5**	D	µg/l	50.0	14.2	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**2,430**	D	µg/l	50.0	13.4	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**170**	D	µg/l	50.0	12.9	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**2,560**	D	µg/l	100	19.0	50	"	"	"	"	"	X
95-47-6	o-Xylene	**119**	D	µg/l	50.0	23.5	50	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*100*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*101*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*93*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*100*			*70-130 %*			"	"	"	"	"	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
MW-28	08-204262.02	Ground Water	26-May-17 15:26	31-May-17
SC35268-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	06-Jun-17	06-Jun-17	GMA	1709333	X
106-93-4	1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5	0.3	1	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	**9.2**		µg/l	1.0	0.3	1	"	"	"	"	"	X
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	**112**	E	µg/l	1.0	0.3	1	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	**27.0**		µg/l	1.0	0.3	1	"	"	"	"	"	X
179601-23-1	m,p-Xylene	**85.6**		µg/l	2.0	0.4	1	"	"	"	"	"	X
95-47-6	o-Xylene	**2.5**		µg/l	1.0	0.5	1	"	"	"	"	"	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*98*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*93*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*102*			*70-130 %*			"	"	"	"	"	
Re-analysis of Volatile Organic Compounds by GC/MS Prepared by method SW846 5030 Water MS			GS1										
95-63-6	1,2,4-Trimethylbenzene	**110**	D	µg/l	5.0	1.3	5	SW846 8260C	09-Jun-17	09-Jun-17	GMA	1709622	X
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*95*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*102*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*107*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*101*			*70-130 %*			"	"	"	"	"	

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709261 - SW846 5030 Water MS										
Blank (1709261-BLK1)					Prepared & Analyzed: 05-Jun-17					
Benzene	< 1.0		µg/l	1.0						
1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0						
1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	*39.0*		µg/l		*50.0*		*78*	*70-130*		
Surrogate: Toluene-d8	*48.0*		µg/l		*50.0*		*96*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.6*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Dibromofluoromethane	*45.2*		µg/l		*50.0*		*90*	*70-130*		
LCS (1709261-BS1)					Prepared & Analyzed: 05-Jun-17					
Benzene	**20.4**		µg/l		20.0		102	70-130		
1,2-Dibromoethane (EDB)	**22.0**		µg/l		20.0		110	70-130		
1,2-Dichloroethane	**18.8**		µg/l		20.0		94	70-130		
Ethylbenzene	**19.7**		µg/l		20.0		98	70-130		
Methyl tert-butyl ether	**19.1**		µg/l		20.0		95	70-130		
Naphthalene	**23.6**		µg/l		20.0		118	70-130		
Toluene	**19.4**		µg/l		20.0		97	70-130		
1,2,4-Trimethylbenzene	**19.3**		µg/l		20.0		97	70-130		
1,3,5-Trimethylbenzene	**19.2**		µg/l		20.0		96	70-130		
m,p-Xylene	**19.9**		µg/l		20.0		100	70-130		
o-Xylene	**20.1**		µg/l		20.0		101	70-130		
Surrogate: 4-Bromofluorobenzene	*51.9*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*49.3*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*46.5*		µg/l		*50.0*		*93*	*70-130*		
Surrogate: Dibromofluoromethane	*50.0*		µg/l		*50.0*		*100*	*70-130*		
LCS Dup (1709261-BSD1)					Prepared & Analyzed: 05-Jun-17					
Benzene	**21.0**		µg/l		20.0		105	70-130	3	20
1,2-Dibromoethane (EDB)	**21.8**		µg/l		20.0		109	70-130	1	20
1,2-Dichloroethane	**18.6**		µg/l		20.0		93	70-130	0.9	20
Ethylbenzene	**20.2**		µg/l		20.0		101	70-130	2	20
Methyl tert-butyl ether	**21.8**		µg/l		20.0		109	70-130	13	20
Naphthalene	**21.4**		µg/l		20.0		107	70-130	10	20
Toluene	**20.9**		µg/l		20.0		104	70-130	7	20
1,2,4-Trimethylbenzene	**22.0**		µg/l		20.0		110	70-130	13	20
1,3,5-Trimethylbenzene	**21.6**		µg/l		20.0		108	70-130	12	20
m,p-Xylene	**20.3**		µg/l		20.0		102	70-130	2	20
o-Xylene	**21.2**		µg/l		20.0		106	70-130	5	20
Surrogate: 4-Bromofluorobenzene	*53.4*		µg/l		*50.0*		*107*	*70-130*		
Surrogate: Toluene-d8	*47.9*		µg/l		*50.0*		*96*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*44.1*		µg/l		*50.0*		*88*	*70-130*		
Surrogate: Dibromofluoromethane	*47.3*		µg/l		*50.0*		*95*	*70-130*		
Matrix Spike (1709261-MS1)			**Source: SC35268-05**		Prepared & Analyzed: 05-Jun-17					
Benzene	**72.9**	D	µg/l		20.0	51.2	108	70-130		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709261 - SW846 5030 Water MS										
Matrix Spike (1709261-MS1)			**Source: SC35268-05**		Prepared & Analyzed: 05-Jun-17					
1,2-Dibromoethane (EDB)	**22.9**	D	µg/l		20.0	0.0	114	70-130		
1,2-Dichloroethane	**19.2**	D	µg/l		20.0	0.0	96	70-130		
Ethylbenzene	**132**	D, E	µg/l		20.0	112	96	70-130		
Methyl tert-butyl ether	**101**	QM7, D, E	µg/l		20.0	102	-7	70-130		
Naphthalene	**68.5**	D	µg/l		20.0	48.1	102	70-130		
Toluene	**23.4**	D	µg/l		20.0	2.9	102	70-130		
1,2,4-Trimethylbenzene	**150**	D, E	µg/l		20.0	129	105	70-130		
1,3,5-Trimethylbenzene	**32.1**	D	µg/l		20.0	10.8	107	70-130		
m,p-Xylene	**160**	D, E	µg/l		20.0	142	92	70-130		
o-Xylene	**26.0**	D	µg/l		20.0	5.4	103	70-130		
Surrogate: 4-Bromofluorobenzene	*50.1*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*49.4*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*46.7*		µg/l		*50.0*		*93*	*70-130*		
Surrogate: Dibromofluoromethane	*50.5*		µg/l		*50.0*		*101*	*70-130*		
Matrix Spike Dup (1709261-MSD1)			**Source: SC35268-05**		Prepared & Analyzed: 05-Jun-17					
Benzene	**71.0**	D	µg/l		20.0	51.2	99	70-130	3	20
1,2-Dibromoethane (EDB)	**21.6**	D	µg/l		20.0	0.0	108	70-130	6	20
1,2-Dichloroethane	**18.2**	D	µg/l		20.0	0.0	91	70-130	5	20
Ethylbenzene	**136**	D, E	µg/l		20.0	112	120	70-130	3	20
Methyl tert-butyl ether	**102**	QM7, D, E	µg/l		20.0	102	-2	70-130	0.9	20
Naphthalene	**53.9**	QM7, QR5, D	µg/l		20.0	48.1	29	70-130	24	20
Toluene	**22.8**	D	µg/l		20.0	2.9	100	70-130	2	20
1,2,4-Trimethylbenzene	**160**	QM7, D, E	µg/l		20.0	129	155	70-130	6	20
1,3,5-Trimethylbenzene	**34.9**	D	µg/l		20.0	10.8	121	70-130	8	20
m,p-Xylene	**177**	QM7, D, E	µg/l		20.0	142	175	70-130	10	20
o-Xylene	**30.8**	D	µg/l		20.0	5.4	127	70-130	17	20
Surrogate: 4-Bromofluorobenzene	*60.4*		µg/l		*50.0*		*121*	*70-130*		
Surrogate: Toluene-d8	*49.0*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*44.1*		µg/l		*50.0*		*88*	*70-130*		
Surrogate: Dibromofluoromethane	*48.9*		µg/l		*50.0*		*98*	*70-130*		
Batch 1709333 - SW846 5030 Water MS										
Blank (1709333-BLK1)					Prepared & Analyzed: 06-Jun-17					
Benzene	< 1.0		µg/l	1.0						
1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0						
1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	*49.4*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Toluene-d8	*50.6*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*48.7*		µg/l		*50.0*		*97*	*70-130*		
Surrogate: Dibromofluoromethane	*51.4*		µg/l		*50.0*		*103*	*70-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709333 - SW846 5030 Water MS										
LCS (1709333-BS1)					Prepared & Analyzed: 06-Jun-17					
Benzene	**22.0**		µg/l		20.0		110	70-130		
1,2-Dibromoethane (EDB)	**21.4**		µg/l		20.0		107	70-130		
1,2-Dichloroethane	**21.3**		µg/l		20.0		107	70-130		
Ethylbenzene	**20.5**		µg/l		20.0		102	70-130		
Methyl tert-butyl ether	**26.5**	QM9	µg/l		20.0		133	70-130		
Naphthalene	**14.7**		µg/l		20.0		74	70-130		
Toluene	**21.4**		µg/l		20.0		107	70-130		
1,2,4-Trimethylbenzene	**21.2**		µg/l		20.0		106	70-130		
1,3,5-Trimethylbenzene	**20.6**		µg/l		20.0		103	70-130		
m,p-Xylene	**20.7**		µg/l		20.0		103	70-130		
o-Xylene	**20.4**		µg/l		20.0		102	70-130		
Surrogate: 4-Bromofluorobenzene	*50.8*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*51.0*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*47.7*		µg/l		*50.0*		*95*	*70-130*		
Surrogate: Dibromofluoromethane	*51.0*		µg/l		*50.0*		*102*	*70-130*		
LCS Dup (1709333-BSD1)					Prepared & Analyzed: 06-Jun-17					
Benzene	**21.4**		µg/l		20.0		107	70-130	3	20
1,2-Dibromoethane (EDB)	**21.0**		µg/l		20.0		105	70-130	2	20
1,2-Dichloroethane	**20.9**		µg/l		20.0		105	70-130	2	20
Ethylbenzene	**19.1**		µg/l		20.0		96	70-130	7	20
Methyl tert-butyl ether	**25.2**		µg/l		20.0		126	70-130	5	20
Naphthalene	**13.5**	QM9	µg/l		20.0		67	70-130	9	20
Toluene	**20.3**		µg/l		20.0		101	70-130	5	20
1,2,4-Trimethylbenzene	**19.4**		µg/l		20.0		97	70-130	9	20
1,3,5-Trimethylbenzene	**19.0**		µg/l		20.0		95	70-130	8	20
m,p-Xylene	**19.3**		µg/l		20.0		96	70-130	7	20
o-Xylene	**20.3**		µg/l		20.0		101	70-130	0.7	20
Surrogate: 4-Bromofluorobenzene	*49.6*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Toluene-d8	*50.6*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*48.7*		µg/l		*50.0*		*97*	*70-130*		
Surrogate: Dibromofluoromethane	*50.9*		µg/l		*50.0*		*102*	*70-130*		
Batch 1709410 - SW846 5030 Water MS										
Blank (1709410-BLK1)					Prepared & Analyzed: 07-Jun-17					
Benzene	< 1.0		µg/l	1.0						
1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0						
1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	*50.0*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*51.5*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.3*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Dibromofluoromethane	*51.1*		µg/l		*50.0*		*102*	*70-130*		
LCS (1709410-BS1)					Prepared & Analyzed: 07-Jun-17					

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709410 - SW846 5030 Water MS										
LCS (1709410-BS1)					Prepared & Analyzed: 07-Jun-17					
Benzene	**23.3**		µg/l		20.0		116	70-130		
1,2-Dibromoethane (EDB)	**22.0**		µg/l		20.0		110	70-130		
1,2-Dichloroethane	**23.7**		µg/l		20.0		119	70-130		
Ethylbenzene	**20.8**		µg/l		20.0		104	70-130		
Methyl tert-butyl ether	**21.2**		µg/l		20.0		106	70-130		
Naphthalene	**16.3**		µg/l		20.0		81	70-130		
Toluene	**22.6**		µg/l		20.0		113	70-130		
1,2,4-Trimethylbenzene	**21.6**		µg/l		20.0		108	70-130		
1,3,5-Trimethylbenzene	**21.0**		µg/l		20.0		105	70-130		
m,p-Xylene	**20.9**		µg/l		20.0		104	70-130		
o-Xylene	**21.4**		µg/l		20.0		107	70-130		
Surrogate: 4-Bromofluorobenzene	*50.9*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*52.6*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.1*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: Dibromofluoromethane	*51.7*		µg/l		*50.0*		*103*	*70-130*		
LCS Dup (1709410-BSD1)					Prepared & Analyzed: 07-Jun-17					
Benzene	**22.3**		µg/l		20.0		111	70-130	4	20
1,2-Dibromoethane (EDB)	**21.8**		µg/l		20.0		109	70-130	1	20
1,2-Dichloroethane	**23.2**		µg/l		20.0		116	70-130	2	20
Ethylbenzene	**19.9**		µg/l		20.0		100	70-130	5	20
Methyl tert-butyl ether	**21.0**		µg/l		20.0		105	70-130	0.7	20
Naphthalene	**17.1**		µg/l		20.0		86	70-130	5	20
Toluene	**21.4**		µg/l		20.0		107	70-130	5	20
1,2,4-Trimethylbenzene	**20.1**		µg/l		20.0		101	70-130	7	20
1,3,5-Trimethylbenzene	**19.8**		µg/l		20.0		99	70-130	6	20
m,p-Xylene	**19.8**		µg/l		20.0		99	70-130	5	20
o-Xylene	**20.2**		µg/l		20.0		101	70-130	6	20
Surrogate: 4-Bromofluorobenzene	*51.3*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Toluene-d8	*52.8*		µg/l		*50.0*		*106*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.5*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Dibromofluoromethane	*51.5*		µg/l		*50.0*		*103*	*70-130*		
Matrix Spike (1709410-MS1)				**Source: SC35268-08RE1**	Prepared & Analyzed: 07-Jun-17					
Benzene	**33.6**	D	µg/l		20.0	11.8	109	70-130		
1,2-Dibromoethane (EDB)	**21.0**	D	µg/l		20.0	0.0	105	70-130		
1,2-Dichloroethane	**21.7**	D	µg/l		20.0	0.0	109	70-130		
Ethylbenzene	**32.2**	D	µg/l		20.0	12.1	101	70-130		
Methyl tert-butyl ether	**20.6**	D	µg/l		20.0	0.0	103	70-130		
Naphthalene	**35.7**	QM7, D	µg/l		20.0	6.5	146	70-130		
Toluene	**24.4**	D	µg/l		20.0	2.4	110	70-130		
1,2,4-Trimethylbenzene	**41.8**	D	µg/l		20.0	20.2	108	70-130		
1,3,5-Trimethylbenzene	**25.8**	D	µg/l		20.0	4.5	106	70-130		
m,p-Xylene	**54.3**	D	µg/l		20.0	34.1	101	70-130		
o-Xylene	**21.6**	D	µg/l		20.0	0.9	103	70-130		
Surrogate: 4-Bromofluorobenzene	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*52.8*		µg/l		*50.0*		*106*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*48.3*		µg/l		*50.0*		*97*	*70-130*		
Surrogate: Dibromofluoromethane	*50.5*		µg/l		*50.0*		*101*	*70-130*		
Matrix Spike Dup (1709410-MSD1)				**Source: SC35268-08RE1**	Prepared & Analyzed: 07-Jun-17					
Benzene	**33.8**	D	µg/l		20.0	11.8	110	70-130	0.5	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709410 - SW846 5030 Water MS										
Matrix Spike Dup (1709410-MSD1)			**Source: SC35268-08RE1**		Prepared & Analyzed: 07-Jun-17					
1,2-Dibromoethane (EDB)	**21.7**	D	µg/l		20.0	0.0	109	70-130	3	20
1,2-Dichloroethane	**22.0**	D	µg/l		20.0	0.0	110	70-130	2	20
Ethylbenzene	**32.1**	D	µg/l		20.0	12.1	100	70-130	0.2	20
Methyl tert-butyl ether	**26.0**	QR2, D	µg/l		20.0	0.0	130	70-130	23	20
Naphthalene	**29.0**	QR5, D	µg/l		20.0	6.5	112	70-130	21	20
Toluene	**24.3**	D	µg/l		20.0	2.4	110	70-130	0.5	20
1,2,4-Trimethylbenzene	**42.4**	D	µg/l		20.0	20.2	111	70-130	2	20
1,3,5-Trimethylbenzene	**25.7**	D	µg/l		20.0	4.5	106	70-130	0.2	20
m,p-Xylene	**54.5**	D	µg/l		20.0	34.1	102	70-130	0.4	20
o-Xylene	**21.6**	D	µg/l		20.0	0.9	103	70-130	0.05	20
Surrogate: 4-Bromofluorobenzene	*50.7*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Toluene-d8	*52.3*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*48.4*		µg/l		*50.0*		*97*	*70-130*		
Surrogate: Dibromofluoromethane	*51.0*		µg/l		*50.0*		*102*	*70-130*		
Batch 1709503 - SW846 5030 Water MS										
Blank (1709503-BLK1)					Prepared & Analyzed: 08-Jun-17					
Benzene	< 1.0		µg/l	1.0						
1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0						
1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	*51.0*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*52.7*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.9*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Dibromofluoromethane	*52.2*		µg/l		*50.0*		*104*	*70-130*		
LCS (1709503-BS1)					Prepared & Analyzed: 08-Jun-17					
Benzene	**23.8**		µg/l		20.0		119	70-130		
1,2-Dibromoethane (EDB)	**22.5**		µg/l		20.0		113	70-130		
1,2-Dichloroethane	**24.1**		µg/l		20.0		121	70-130		
Ethylbenzene	**20.2**		µg/l		20.0		101	70-130		
Methyl tert-butyl ether	**22.0**		µg/l		20.0		110	70-130		
Naphthalene	**16.5**		µg/l		20.0		83	70-130		
Toluene	**23.1**		µg/l		20.0		116	70-130		
1,2,4-Trimethylbenzene	**20.6**		µg/l		20.0		103	70-130		
1,3,5-Trimethylbenzene	**20.4**		µg/l		20.0		102	70-130		
m,p-Xylene	**20.2**		µg/l		20.0		101	70-130		
o-Xylene	**20.8**		µg/l		20.0		104	70-130		
Surrogate: 4-Bromofluorobenzene	*50.0*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*53.4*		µg/l		*50.0*		*107*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.5*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Dibromofluoromethane	*53.6*		µg/l		*50.0*		*107*	*70-130*		
LCS Dup (1709503-BSD1)					Prepared & Analyzed: 08-Jun-17					
Benzene	**21.8**		µg/l		20.0		109	70-130	9	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709503 - SW846 5030 Water MS										
LCS Dup (1709503-BSD1)					Prepared & Analyzed: 08-Jun-17					
1,2-Dibromoethane (EDB)	**22.3**		µg/l		20.0		111	70-130	1	20
1,2-Dichloroethane	**23.3**		µg/l		20.0		116	70-130	4	20
Ethylbenzene	**19.2**		µg/l		20.0		96	70-130	5	20
Methyl tert-butyl ether	**21.2**		µg/l		20.0		106	70-130	4	20
Naphthalene	**16.4**		µg/l		20.0		82	70-130	0.5	20
Toluene	**21.2**		µg/l		20.0		106	70-130	9	20
1,2,4-Trimethylbenzene	**19.6**		µg/l		20.0		98	70-130	5	20
1,3,5-Trimethylbenzene	**19.6**		µg/l		20.0		98	70-130	4	20
m,p-Xylene	**19.6**		µg/l		20.0		98	70-130	3	20
o-Xylene	**19.9**		µg/l		20.0		99	70-130	5	20
Surrogate: 4-Bromofluorobenzene	*51.8*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*52.5*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.4*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Dibromofluoromethane	*51.8*		µg/l		*50.0*		*104*	*70-130*		
Batch 1709622 - SW846 5030 Water MS										
Blank (1709622-BLK1)					Prepared & Analyzed: 09-Jun-17					
Benzene	< 1.0		µg/l	1.0						
1,2-Dibromoethane (EDB)	< 0.5		µg/l	0.5						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,2,4-Trimethylbenzene	< 1.0		µg/l	1.0						
1,3,5-Trimethylbenzene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	*46.1*		µg/l		*50.0*		*92*	*70-130*		
Surrogate: Toluene-d8	*51.2*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.0*		µg/l		*50.0*		*106*	*70-130*		
Surrogate: Dibromofluoromethane	*51.0*		µg/l		*50.0*		*102*	*70-130*		
LCS (1709622-BS1)					Prepared & Analyzed: 09-Jun-17					
Benzene	**19.7**		µg/l		20.0		99	70-130		
1,2-Dibromoethane (EDB)	**21.3**		µg/l		20.0		107	70-130		
1,2-Dichloroethane	**19.7**		µg/l		20.0		99	70-130		
Ethylbenzene	**20.9**		µg/l		20.0		104	70-130		
Methyl tert-butyl ether	**19.7**		µg/l		20.0		98	70-130		
Naphthalene	**19.8**		µg/l		20.0		99	70-130		
Toluene	**20.3**		µg/l		20.0		101	70-130		
1,2,4-Trimethylbenzene	**17.2**		µg/l		20.0		86	70-130		
1,3,5-Trimethylbenzene	**17.3**		µg/l		20.0		87	70-130		
m,p-Xylene	**21.6**		µg/l		20.0		108	70-130		
o-Xylene	**19.5**		µg/l		20.0		98	70-130		
Surrogate: 4-Bromofluorobenzene	*51.6*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Toluene-d8	*50.6*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.2*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: Dibromofluoromethane	*50.2*		µg/l		*50.0*		*100*	*70-130*		
LCS Dup (1709622-BSD1)					Prepared & Analyzed: 09-Jun-17					
Benzene	**20.0**		µg/l		20.0		100	70-130	2	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1709622 - SW846 5030 Water MS										
LCS Dup (1709622-BSD1)					Prepared & Analyzed: 09-Jun-17					
1,2-Dibromoethane (EDB)	**21.6**		µg/l		20.0		108	70-130	1	20
1,2-Dichloroethane	**20.3**		µg/l		20.0		102	70-130	3	20
Ethylbenzene	**21.2**		µg/l		20.0		106	70-130	2	20
Methyl tert-butyl ether	**20.2**		µg/l		20.0		101	70-130	3	20
Naphthalene	**20.4**		µg/l		20.0		102	70-130	3	20
Toluene	**20.4**		µg/l		20.0		102	70-130	0.6	20
1,2,4-Trimethylbenzene	**17.4**		µg/l		20.0		87	70-130	1	20
1,3,5-Trimethylbenzene	**17.4**		µg/l		20.0		87	70-130	0.5	20
m,p-Xylene	**21.7**		µg/l		20.0		109	70-130	0.3	20
o-Xylene	**20.0**		µg/l		20.0		100	70-130	2	20
Surrogate: 4-Bromofluorobenzene	*52.0*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*51.0*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*49.2*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: Dibromofluoromethane	*50.0*		µg/l		*50.0*		*100*	*70-130*		

Notes and Definitions

D	Data reported from a dilution
E	This flag indicates the concentration for this analyte is an estimated value due to exceeding the calibration range or interferences resulting in a biased final concentration.
GS1	Sample dilution required for high concentration of target analytes to be within the instrument calibration range.
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
QR2	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
QR5	RPD out of acceptance range.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

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CHAIN OF CUSTODY RECORD

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Special Handling:

- [x] Standard TAT - 7 to 10 business days
- [ ] Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: ATC
1Elm St, Suite 3
Waterbury Vt
05676
Telephone #: 802-241-4131
Project Mgr: Katrina Mattice

Invoice To: Same

P.O No.: 08-204262.02 Quote #: Special

Project No: 08-204262.02
Site Name: Northern Petroleum
Location: St. Johnsbury State: Vt
Sampler(s): ME

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= Deionized H_2O X2=_____ X3=_____

G= Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: List Preservative Code below: 2 — 8021 BVT	Check if chlorinated
35268-01	Trip Blank	5/26/17	0800	G	X1	1				X	☐
-02	Duplicate		—	G	GW	3				X	☐
-03	MW-5		0952	G	GW	3				X	☐
-04	MW-13		0958	G	GW	3				X	☐
-05	MW-38		1110	G	GW	3				X	☐
-06	MW-39		1116	G	GW	3				X	☐
-07	MW-40		1230	G	GW	3				X	☐
-08	MW-2		1333	G	GW	3				X	☐
-09	MW-37		1417	G	GW	3				X	☐
-10	MW-28		1526	G	GW	3				X	☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
- [x] Standard
- [ ] No QC
- [ ] DQA*
- [ ] ASP A*
- [ ] ASP B*
- [ ] NJ Reduced*
- [ ] NJ Full*
- [ ] Tier II*
- [ ] Tier IV*
- [ ] Other: _____

State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	5/30/17	0820
[signature]	[signature]	6/30/17	1700
[signature]	[signature]	5/31/17	1055

Temp °C: Observed 1.2; Correction Factor 0; Corrected 1.2; IR ID # 02

- [ ] EDD format: _____
- [x] E-mail to: Katrina.mattice@atcassociates.com

Condition upon receipt: Custody Seals: ☑ Present ☑ Intact ☐ Broken
☐ Ambient ☑ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

35268

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:
- [x] Standard TAT - 7 to 10 business days
- [ ] Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: ATC
1Elm St Suite 3
Waterbury Vt
05676
Telephone #: 802-241-4131
Project Mgr: Katrina Mattice

Invoice To: Same

P.O No.: 08-204262.02 Quote #: Special

Project No: 08-204262.02
Site Name: Northern Petroleum
Location: St. Johnsbury State: Vt
Sampler(s): ME

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= Deionized H_2O X2=_____ X3=_____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below: 2	Check if chlorinated
35268-01	Trip Blank	5/26/17	0800	G	X1	1				X	☐
-02	Duplicate		—	G	GW	3				X	☐
-03	MW-5		0952	G	GW	3				X	☐
-04	MW-13R		0958	G	GW	3				X	☐
-05	MW-38		1110	G	GW	3				X	☐
-06	MW-39		1116	G	GW	3				X	☐
-07	MW-40		1230	G	GW	3				X	☐
-08	MW-2		1333	G	GW	3				X	☐
-09	MW-37		1417	G	GW	3				X	☐
10	MW-28		1526	G	GW	3				X	☐

Analysis: 8021 BVT

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
- [x] Standard
- [ ] No QC
- [ ] DQA*
- [ ] ASP A*
- [ ] ASP B*
- [ ] NJ Reduced*
- [ ] NJ Full*
- [ ] Tier II*
- [ ] Tier IV*
- [ ] Other: _____

State-specific reporting standards:

per client req 6/2/17

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	5/30/17	0820
[signature]	[signature]	6/30/17	1700
[signature]	[signature]	5/31/17	1055

Temp °C: Observed 1.2; Correction Factor 0; Corrected 1.2; IR ID # 02

- [ ] EDD format:
- [x] E-mail to: Katrina.mattice@atcassociates.com

Condition upon receipt: Custody Seals: ☑ Present ☑ Intact ☐ Broken
☐ Ambient ☑ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Batch Summary

1709261

Volatile Organic Compounds

1709261-BLK1
1709261-BS1
1709261-BSD1
1709261-MS1
1709261-MSD1
SC35268-02 (Duplicate)
SC35268-03 (MW-5)
SC35268-04 (MW-13R)
SC35268-05 (MW-38)
SC35268-06 (MW-39)

1709333

Volatile Organic Compounds

1709333-BLK1
1709333-BS1
1709333-BSD1
SC35268-08 (MW-2)
SC35268-09 (MW-37)
SC35268-10 (MW-28)

1709410

Volatile Organic Compounds

1709410-BLK1
1709410-BS1
1709410-BSD1
1709410-MS1
1709410-MSD1
SC35268-02RE1 (Duplicate)
SC35268-04RE1 (MW-13R)
SC35268-05RE1 (MW-38)
SC35268-06RE1 (MW-39)
SC35268-07 (MW-40)
SC35268-08RE1 (MW-2)

1709503

Volatile Organic Compounds

1709503-BLK1
1709503-BS1
1709503-BSD1
SC35268-01 (Trip Blank)

1709622

Volatile Organic Compounds

1709622-BLK1
1709622-BS1
1709622-BSD1
SC35268-10RE1 (MW-28)

S704674

Volatile Organic Compounds

S704674-CAL1
S704674-CAL2
S704674-CAL3
S704674-CAL4
S704674-CAL5
S704674-CAL6
S704674-CAL7
S704674-CAL8
S704674-CAL9
S704674-ICV1
S704674-LCV1
S704674-LCV2
S704674-TUN1

S704734

Volatile Organic Compounds

S704734-CAL1
S704734-CAL2
S704734-CAL3
S704734-CAL4
S704734-CAL5
S704734-CAL6
S704734-CAL7
S704734-CAL8
S704734-CAL9
S704734-ICV1
S704734-LCV1
S704734-LCV2
S704734-TUN1

S704772

Volatile Organic Compounds

S704772-CAL1
S704772-CAL2
S704772-CAL3
S704772-CAL4
S704772-CAL5
S704772-CAL6
S704772-CAL7
S704772-CAL8
S704772-CAL9
S704772-CALA
S704772-CALB
S704772-ICV1
S704772-LCV1
S704772-LCV2
S704772-TUN1

S705051

Volatile Organic Compounds

S705051-CCV1
S705051-TUN1

S705083

Volatile Organic Compounds

S705083-CCV1
S705083-TUN1

S705111

Volatile Organic Compounds

S705111-CCV1
S705111-TUN1

S705157

Volatile Organic Compounds

S705157-CCV1
S705157-TUN1

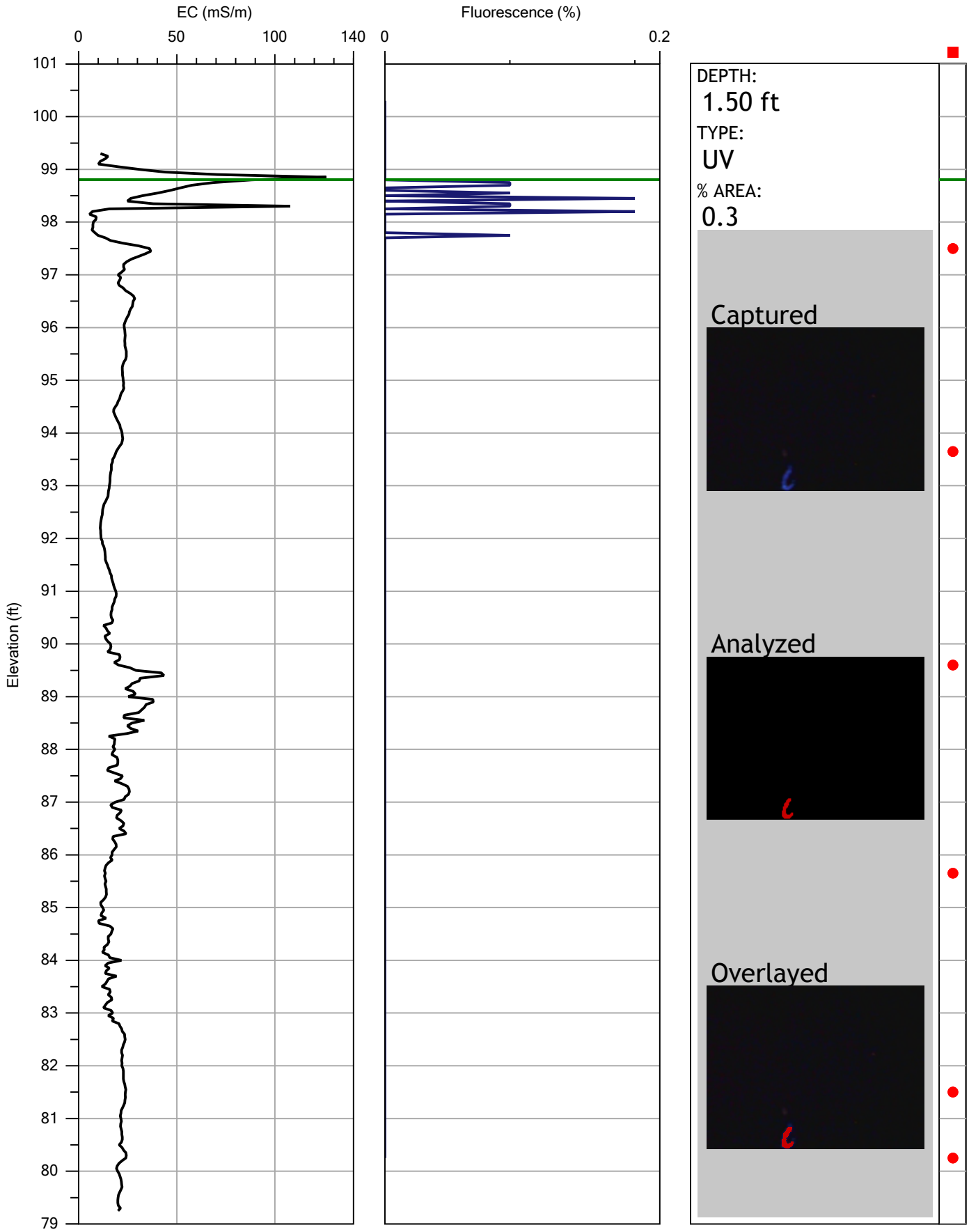
S705215

Volatile Organic Compounds

S705215-CCV1
S705215-TUN1

APPENDIX B

OIP LOGS



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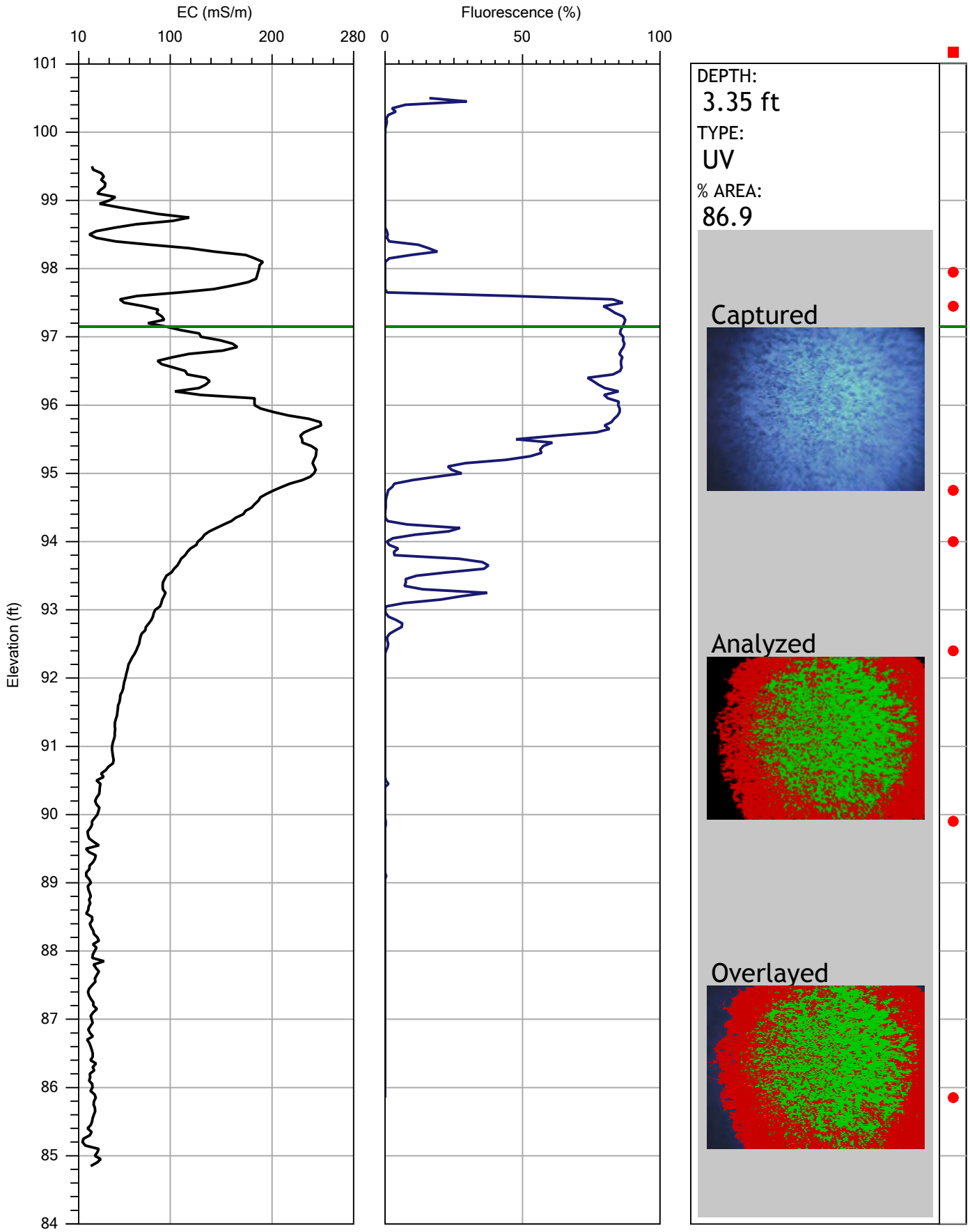

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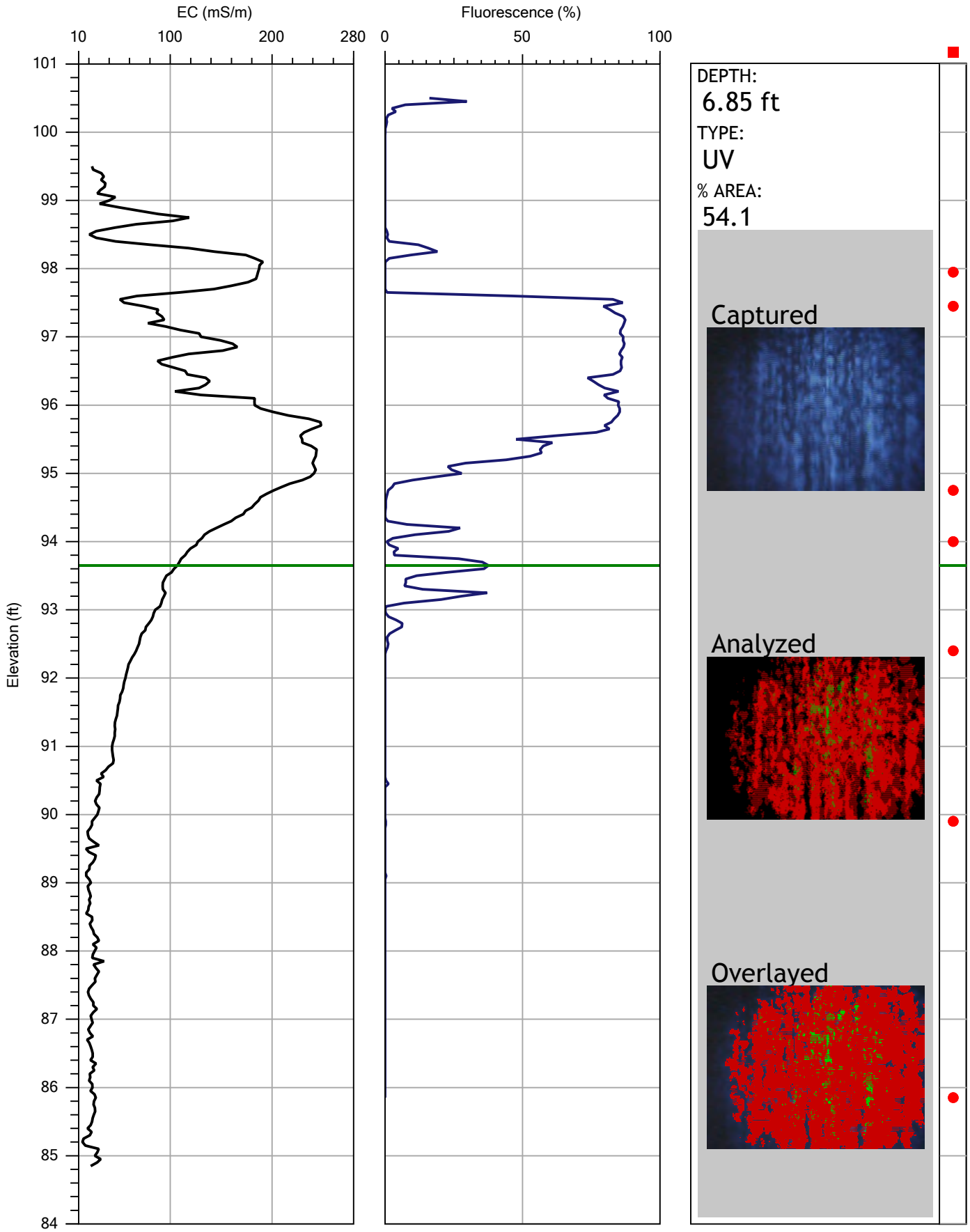

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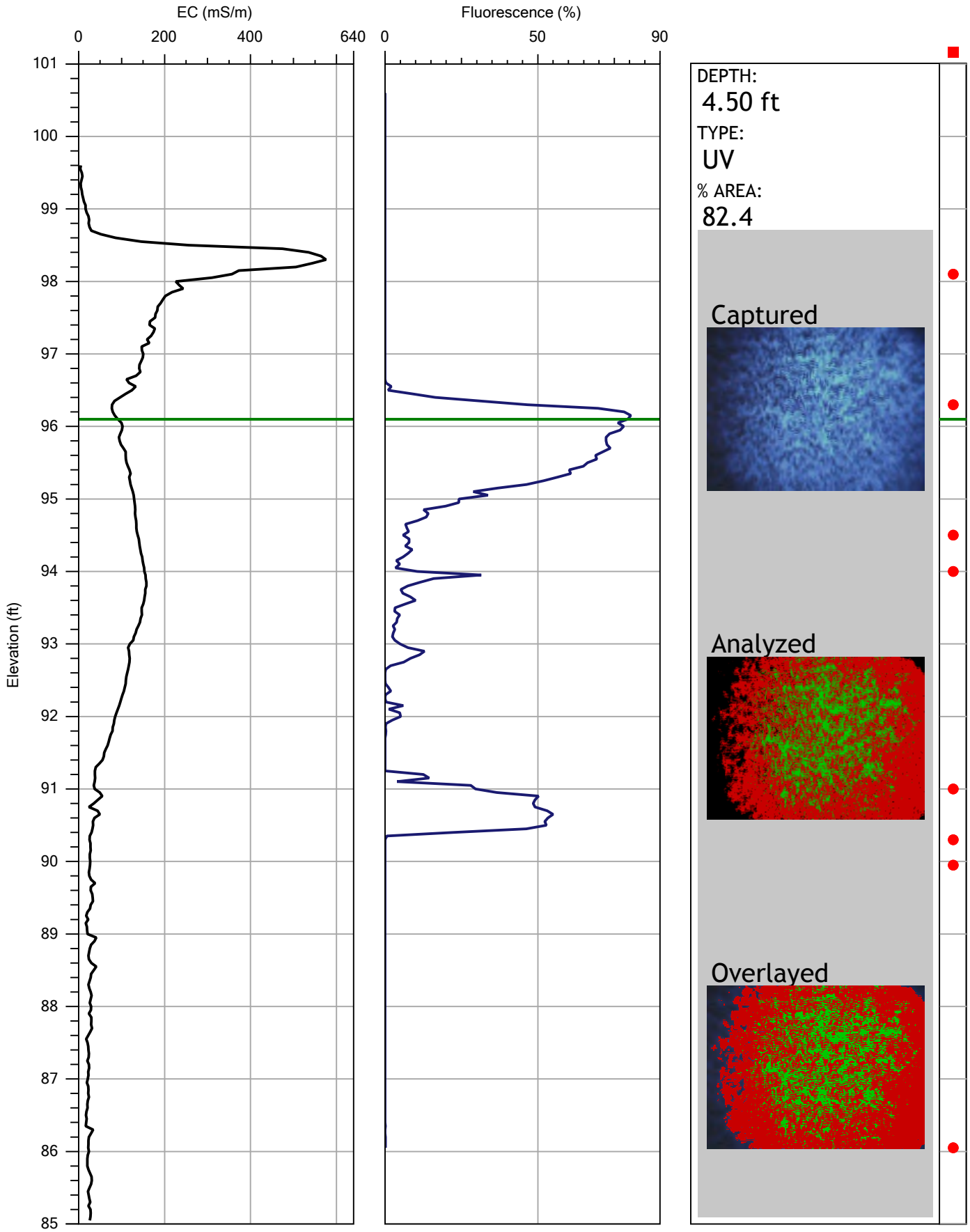

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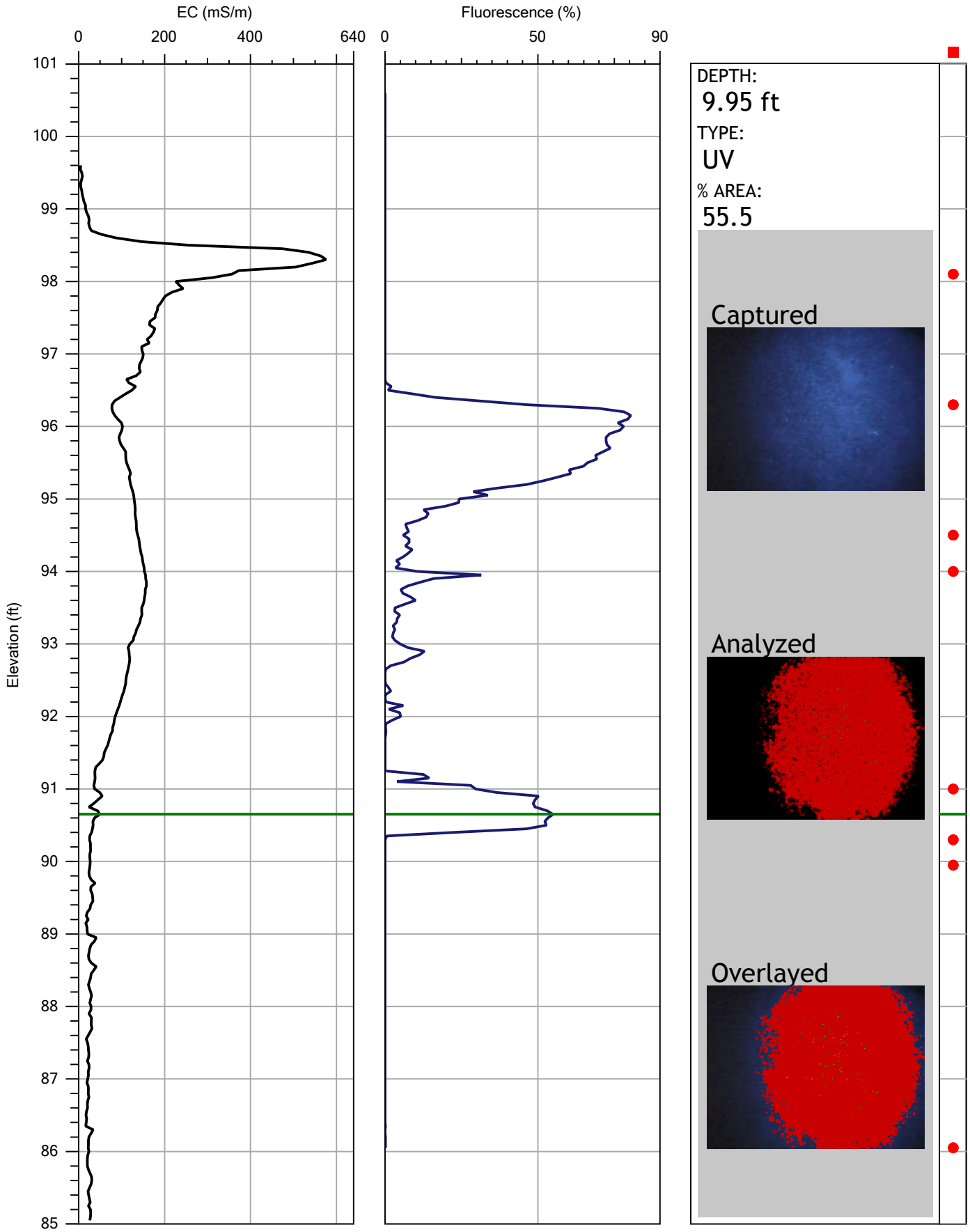
Project ID: Dead River	Client: ATC	Location: OIP-03



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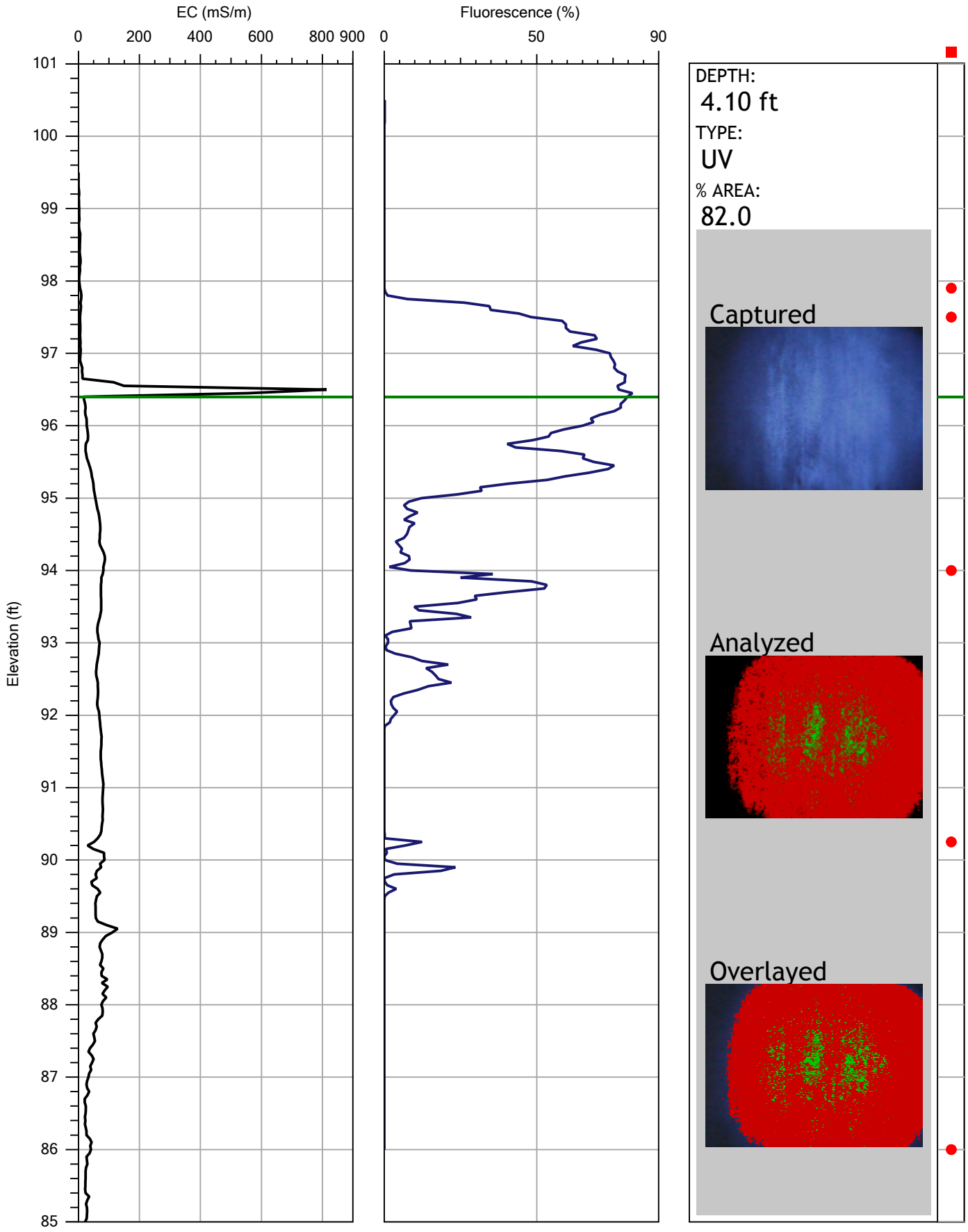

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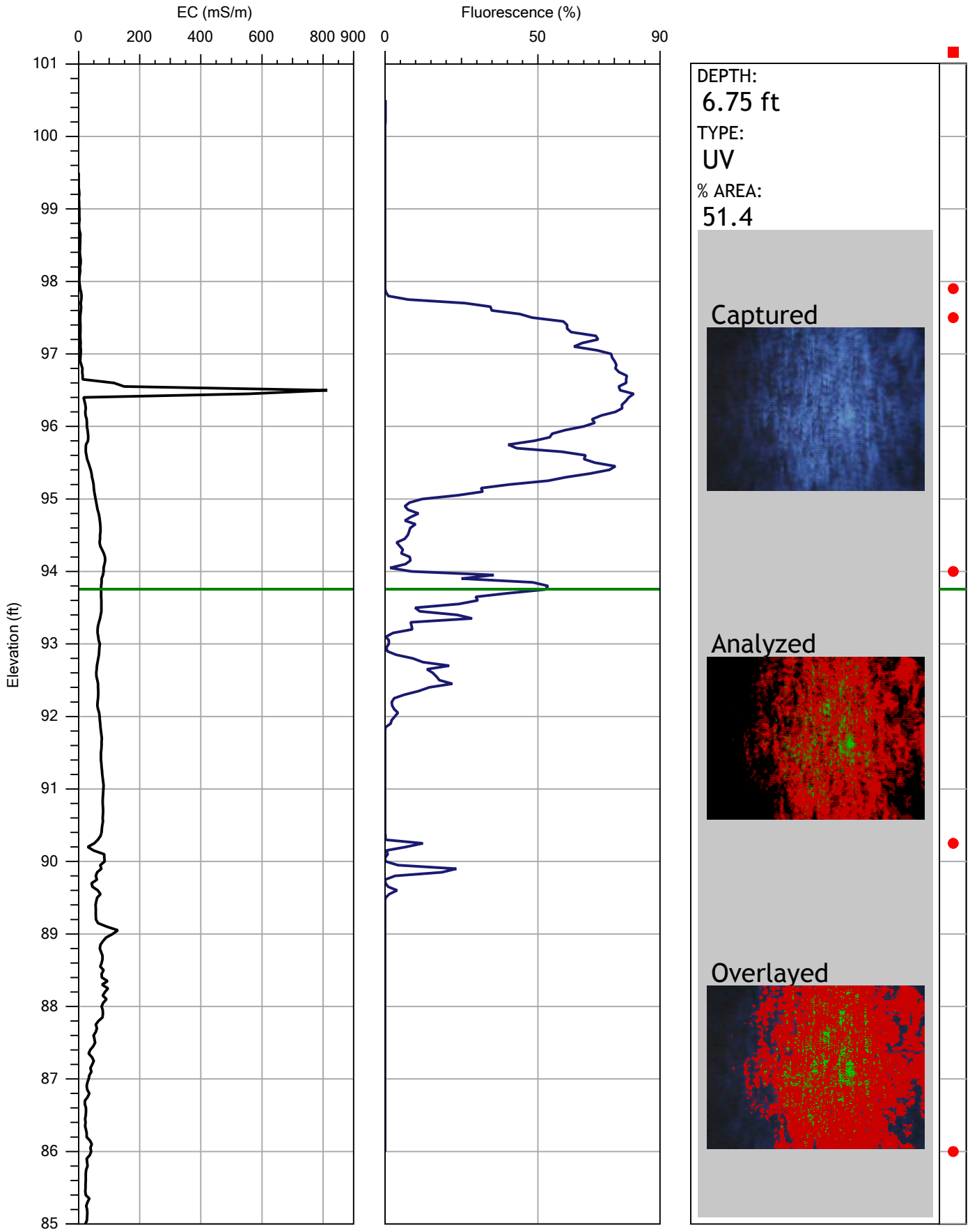

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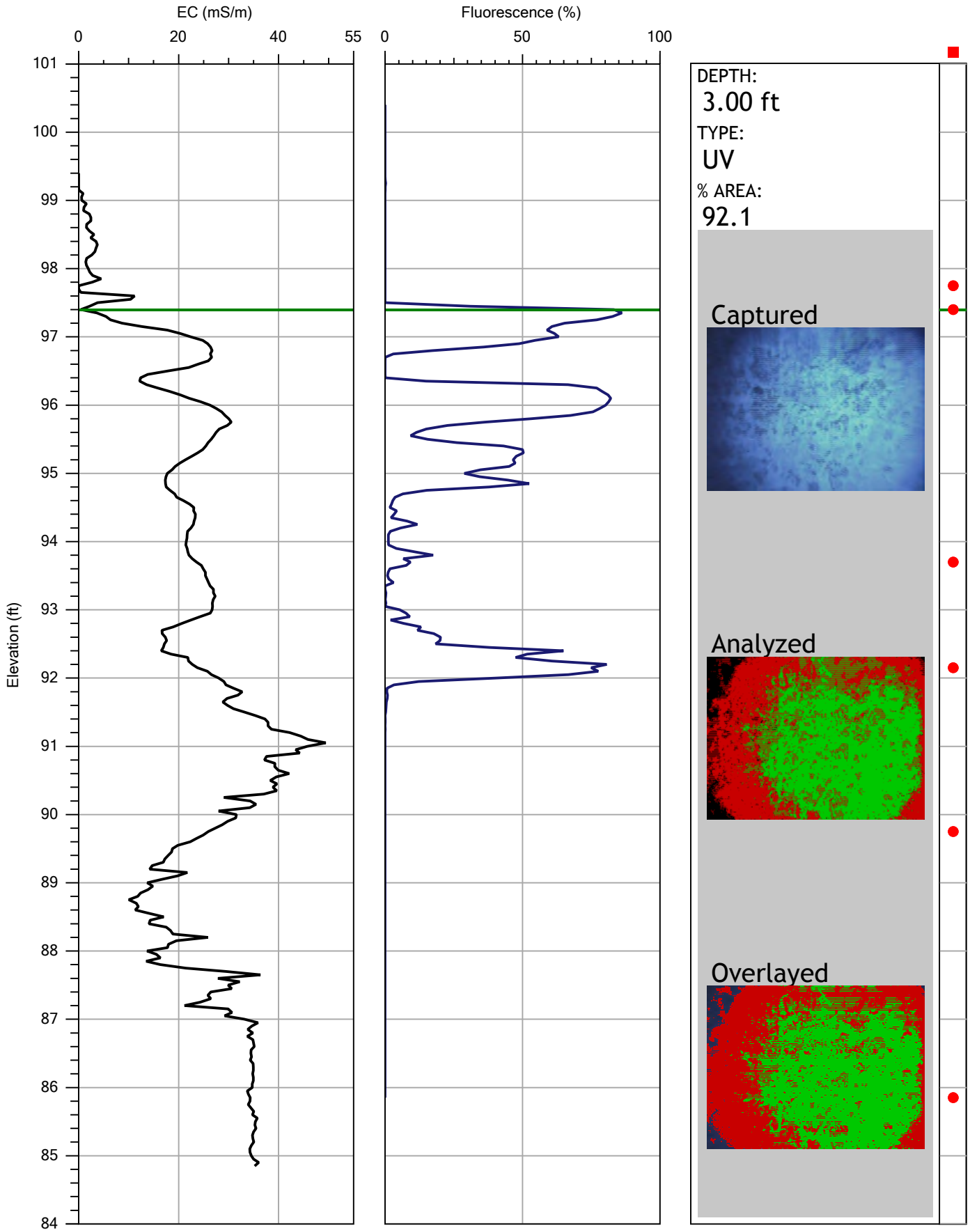
Company: S2C2		Operator: TK	Date: 5/9/2017
Project ID: Dead River		Client: ATC	Location: OIP-04



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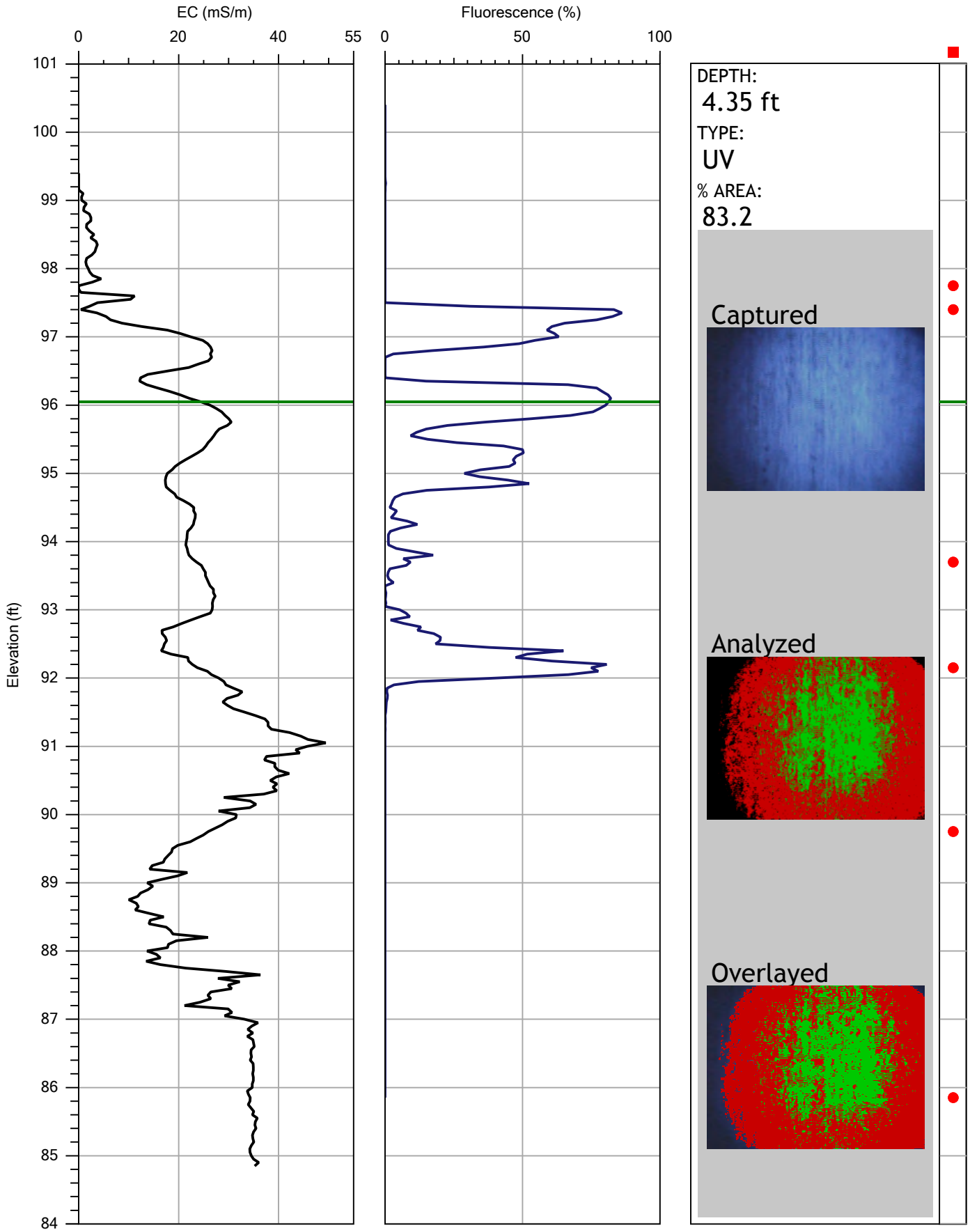

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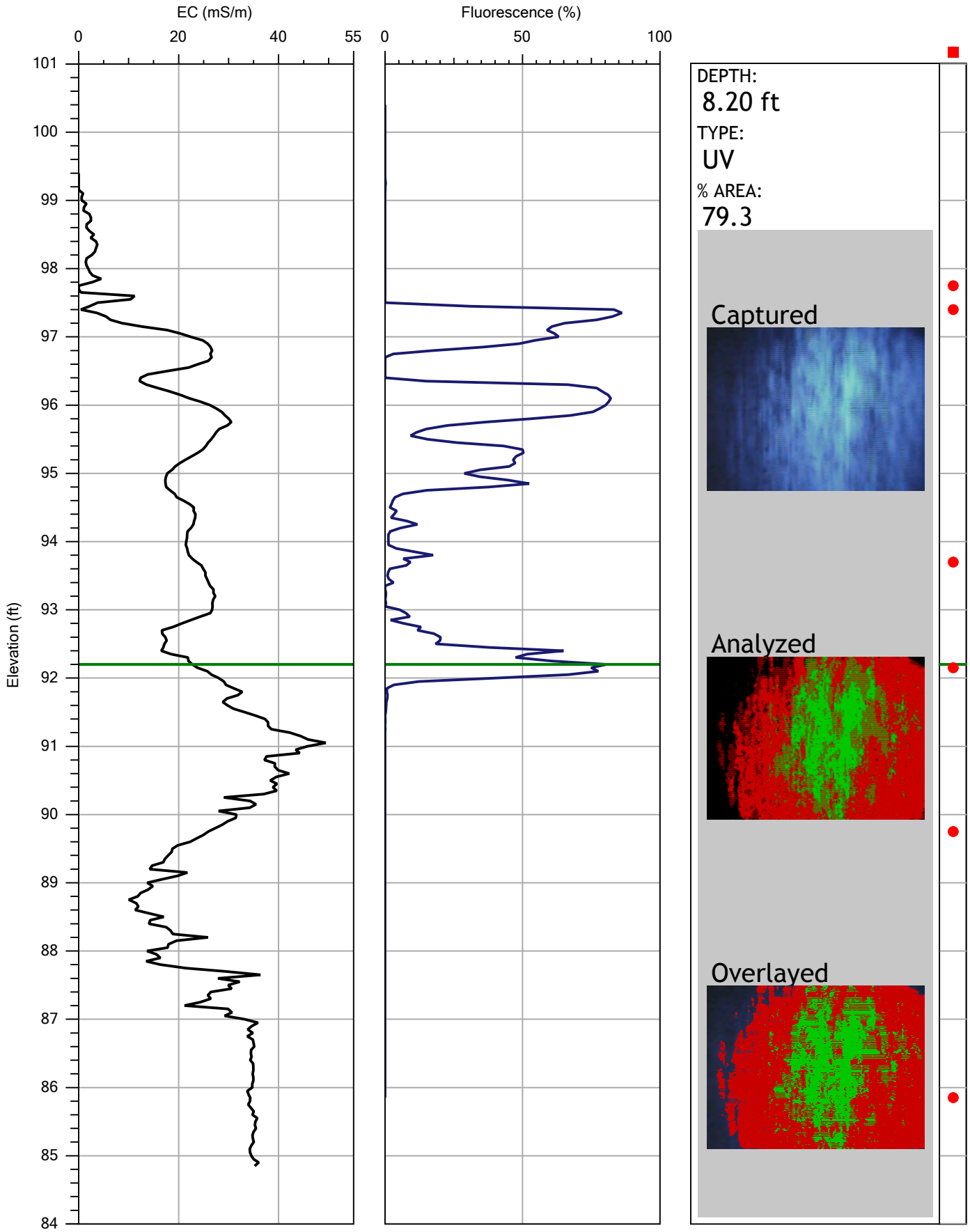

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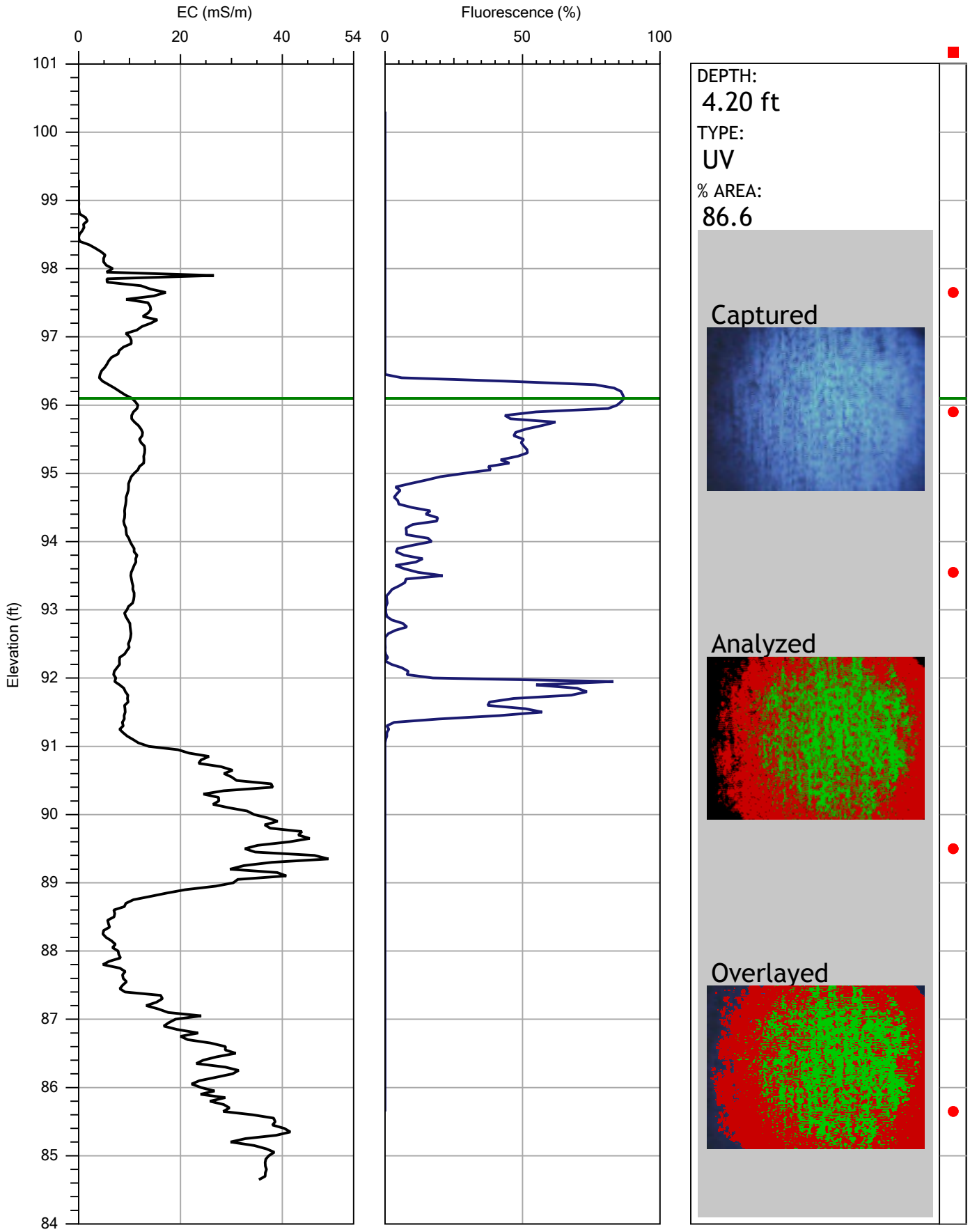

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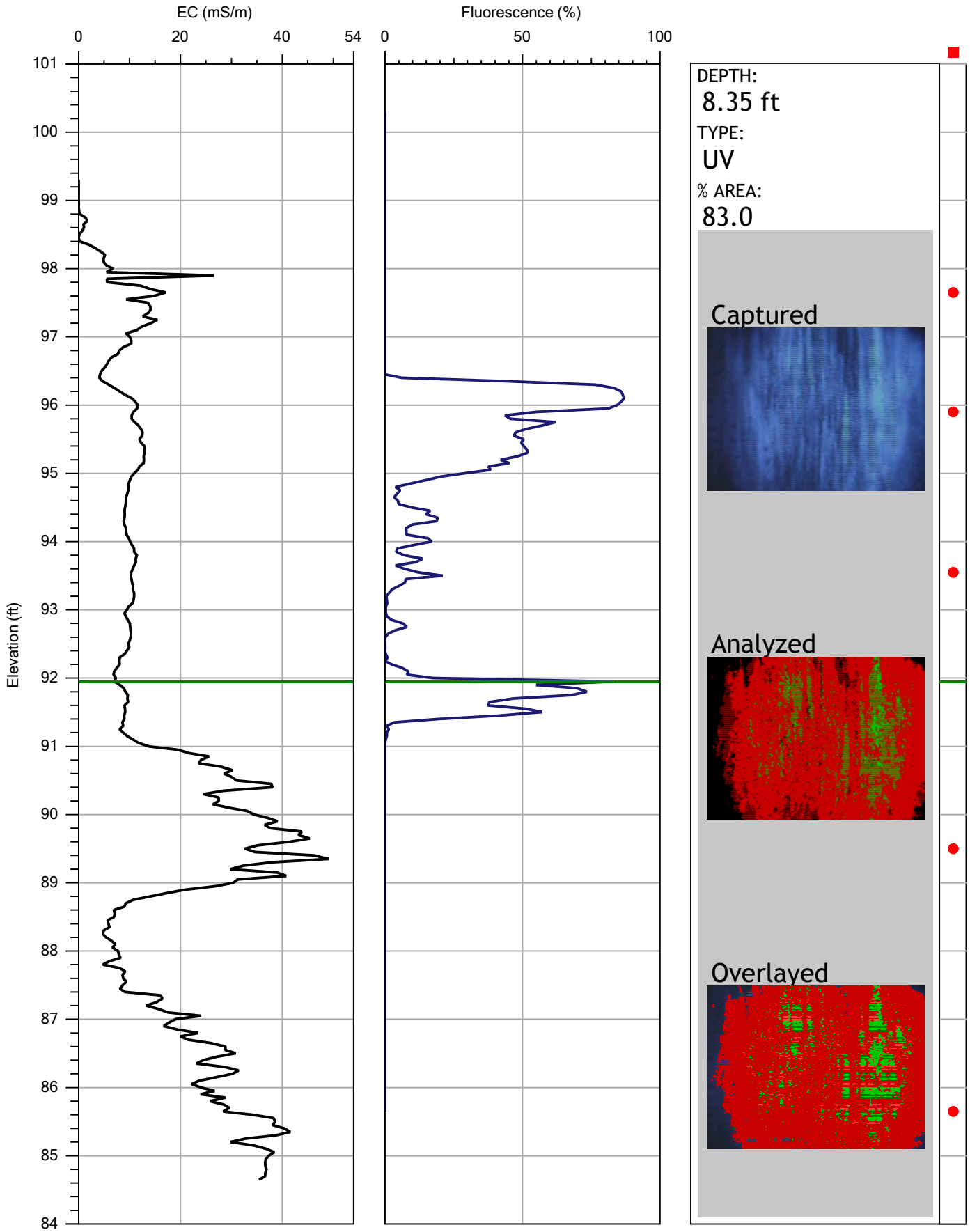

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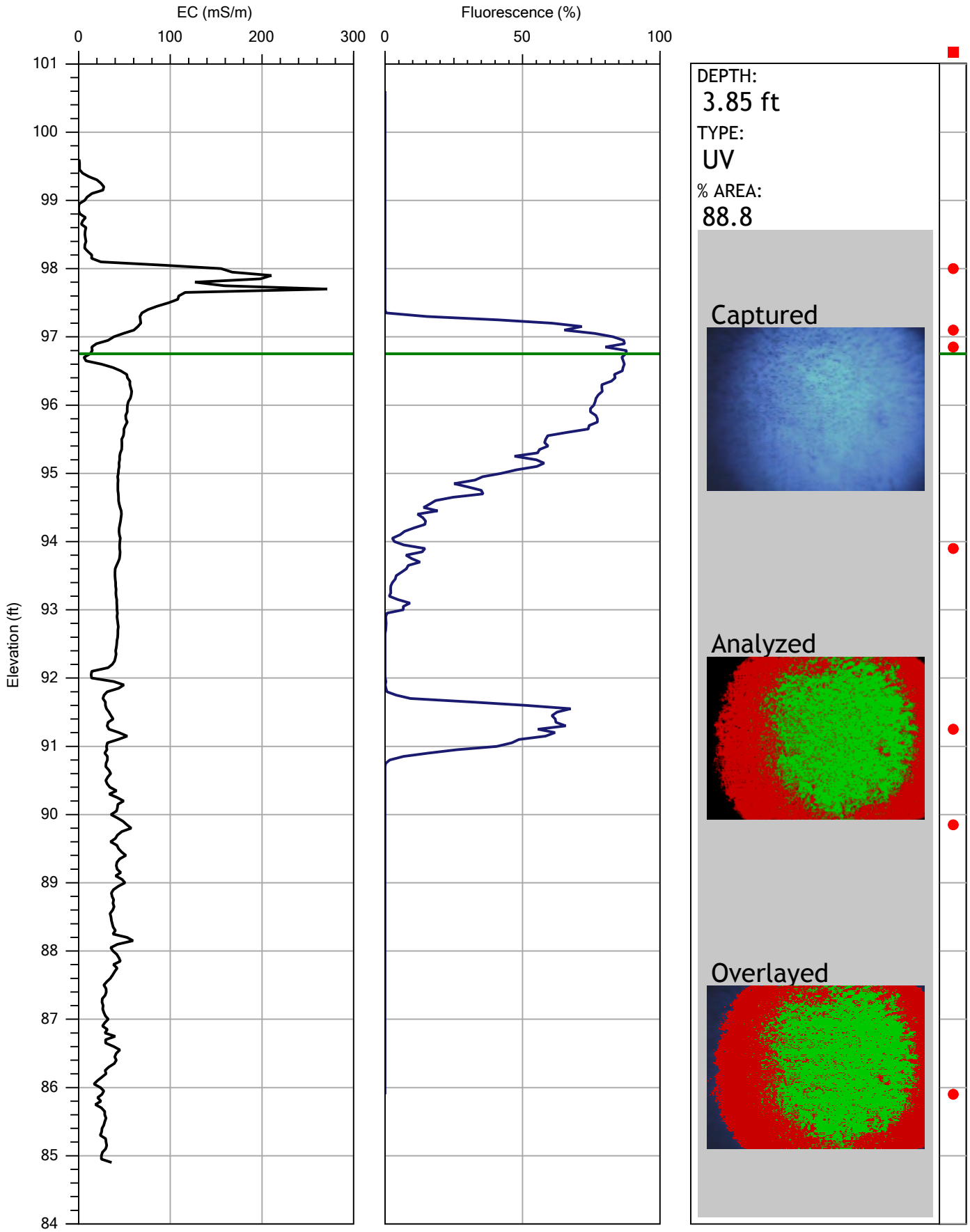

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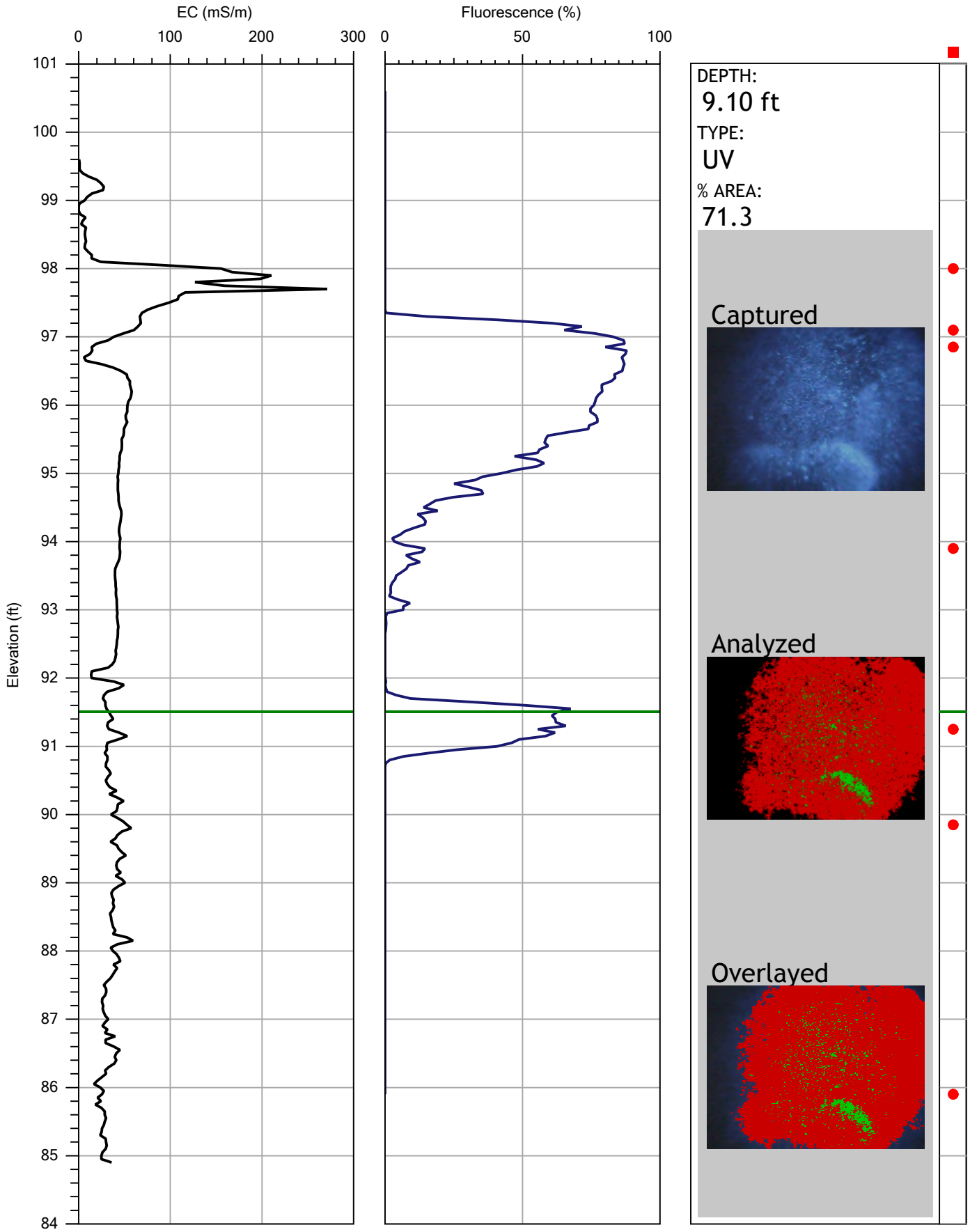

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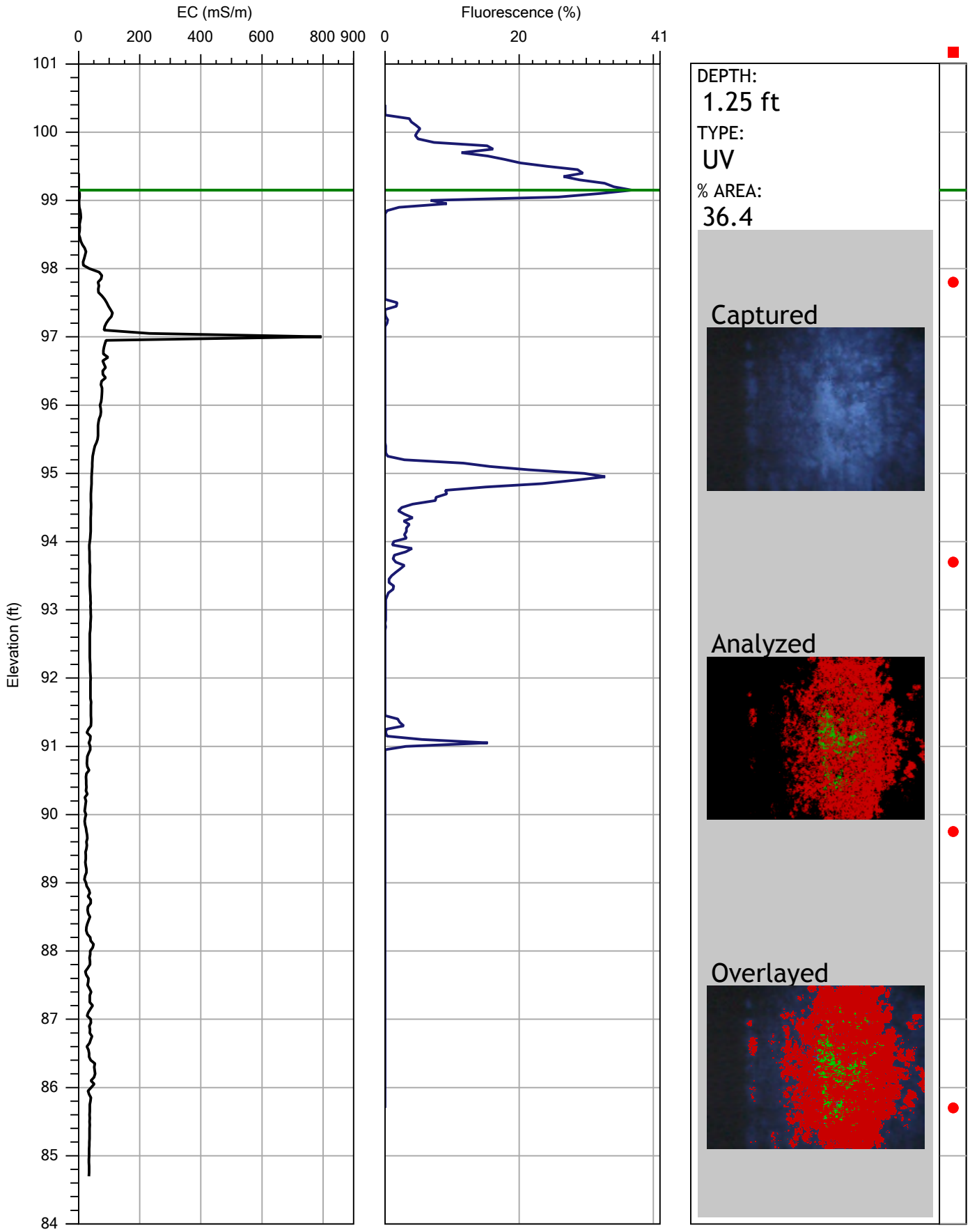

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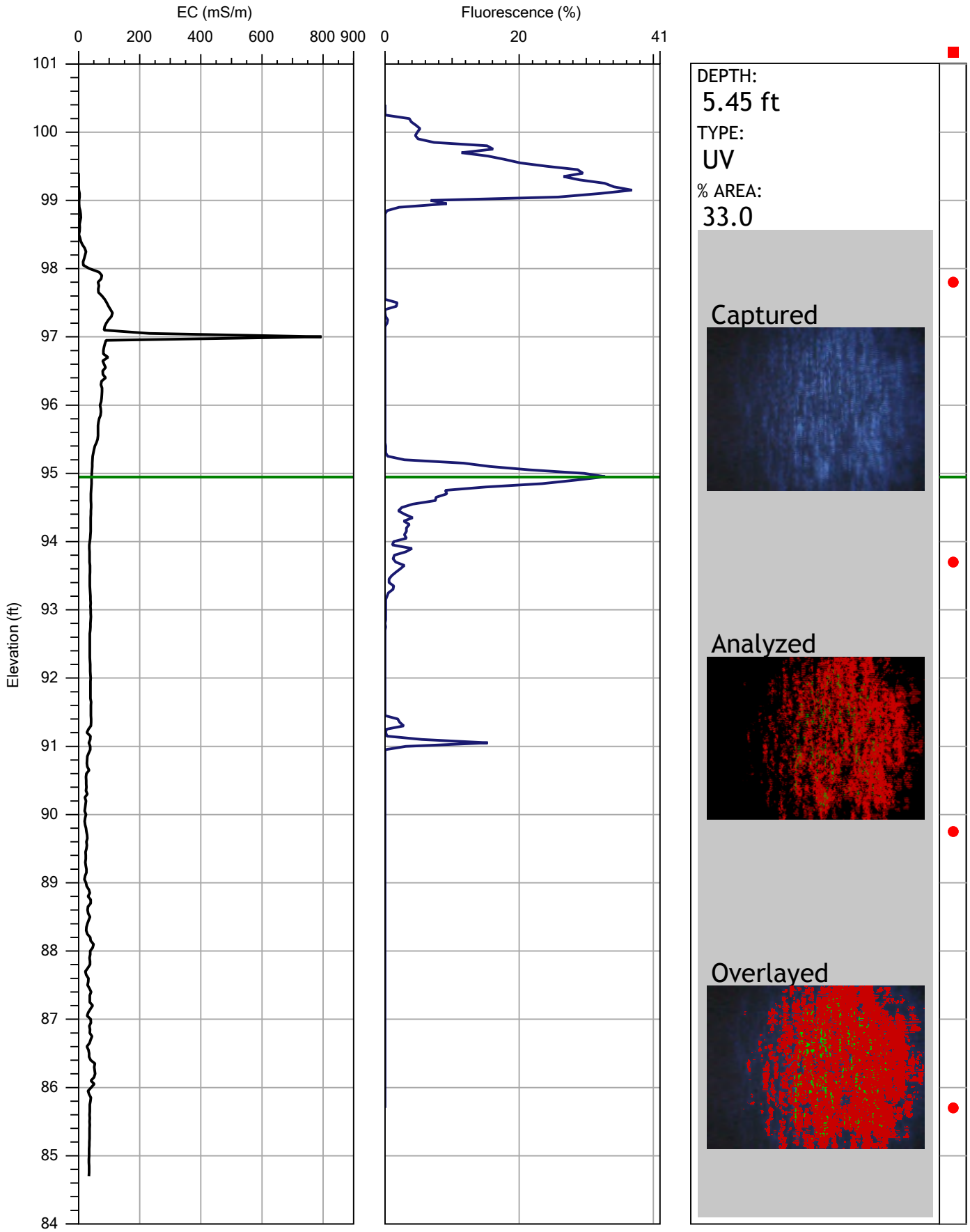

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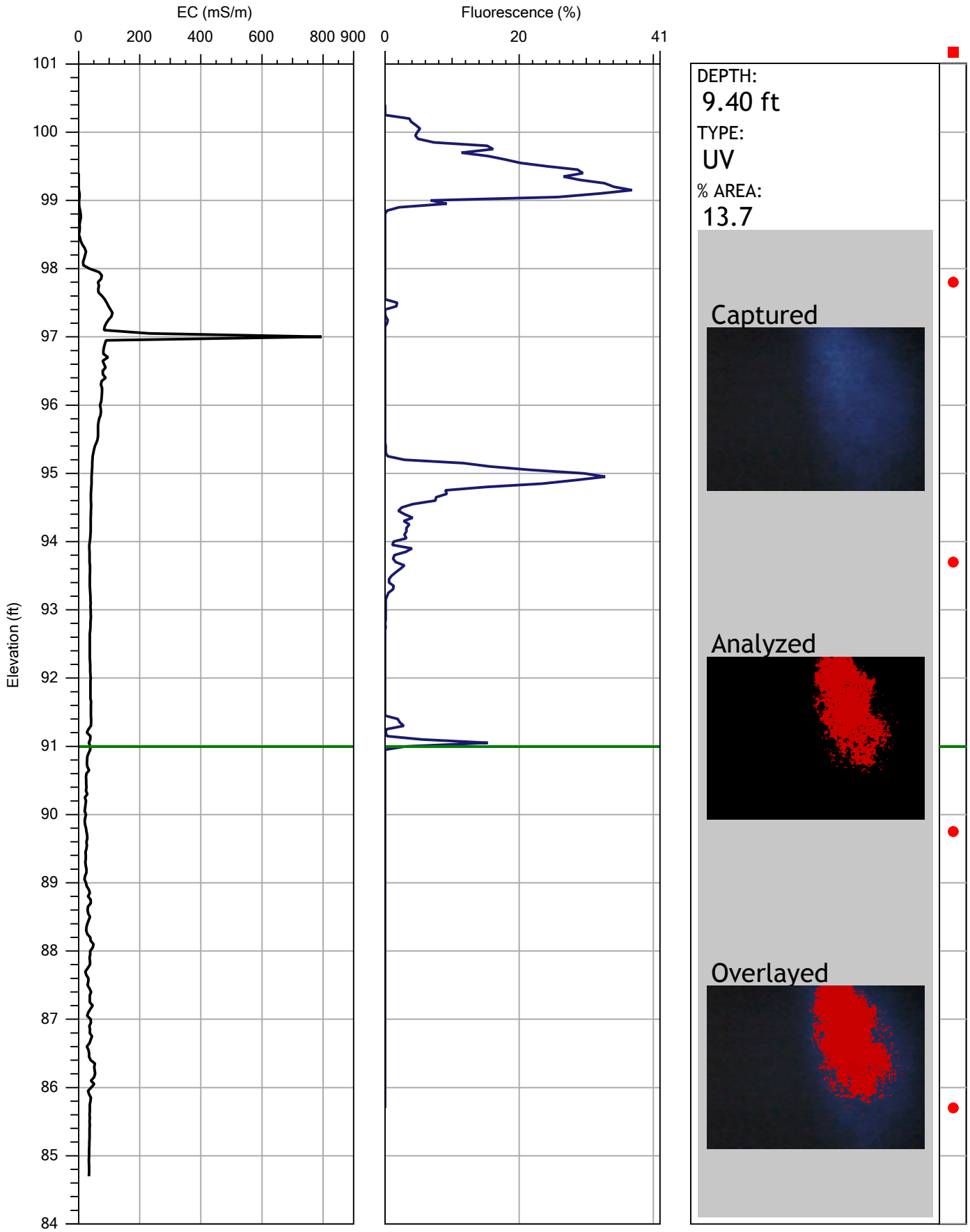
Project ID: Dead River	Client: ATC	Location: OIP-08	



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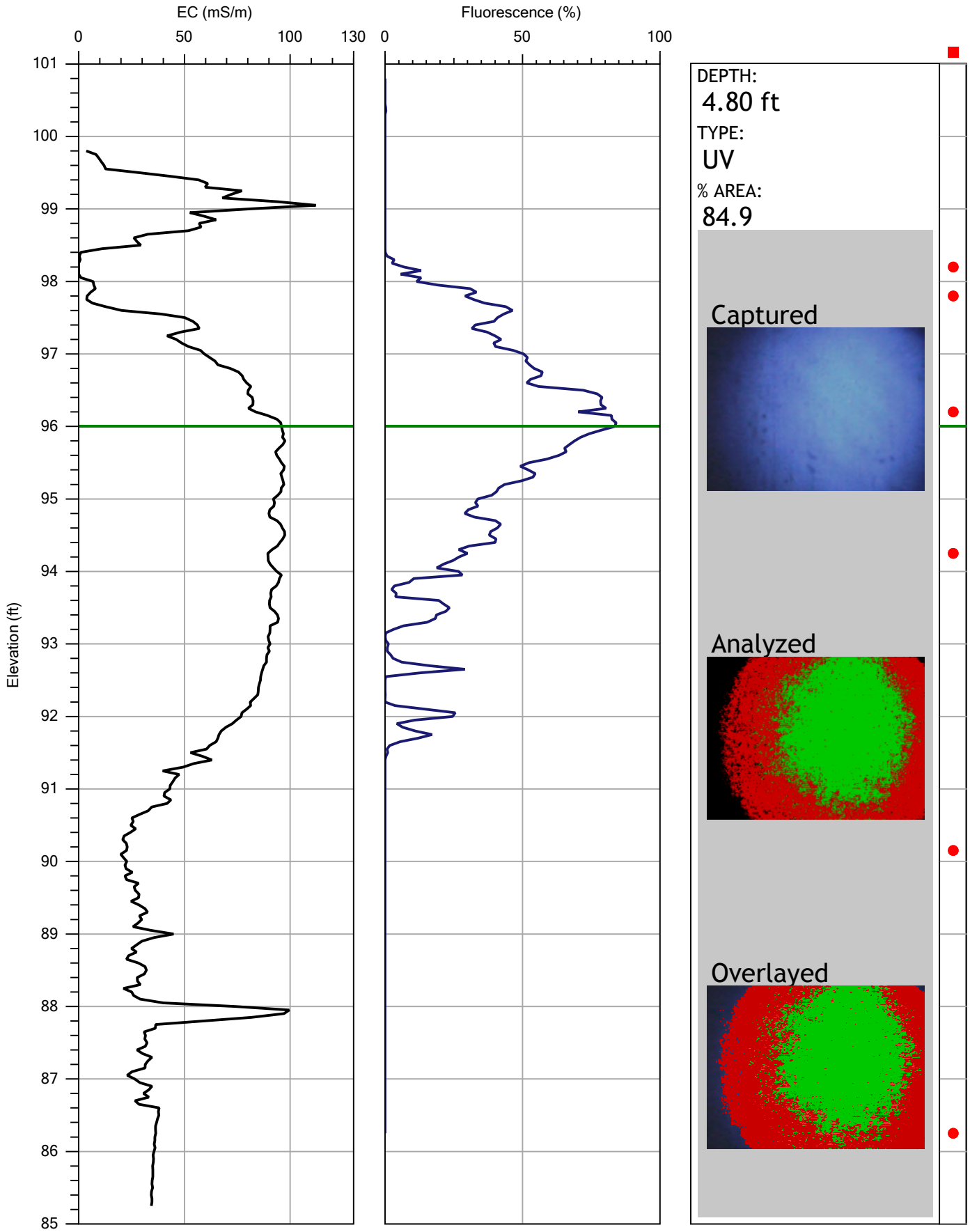

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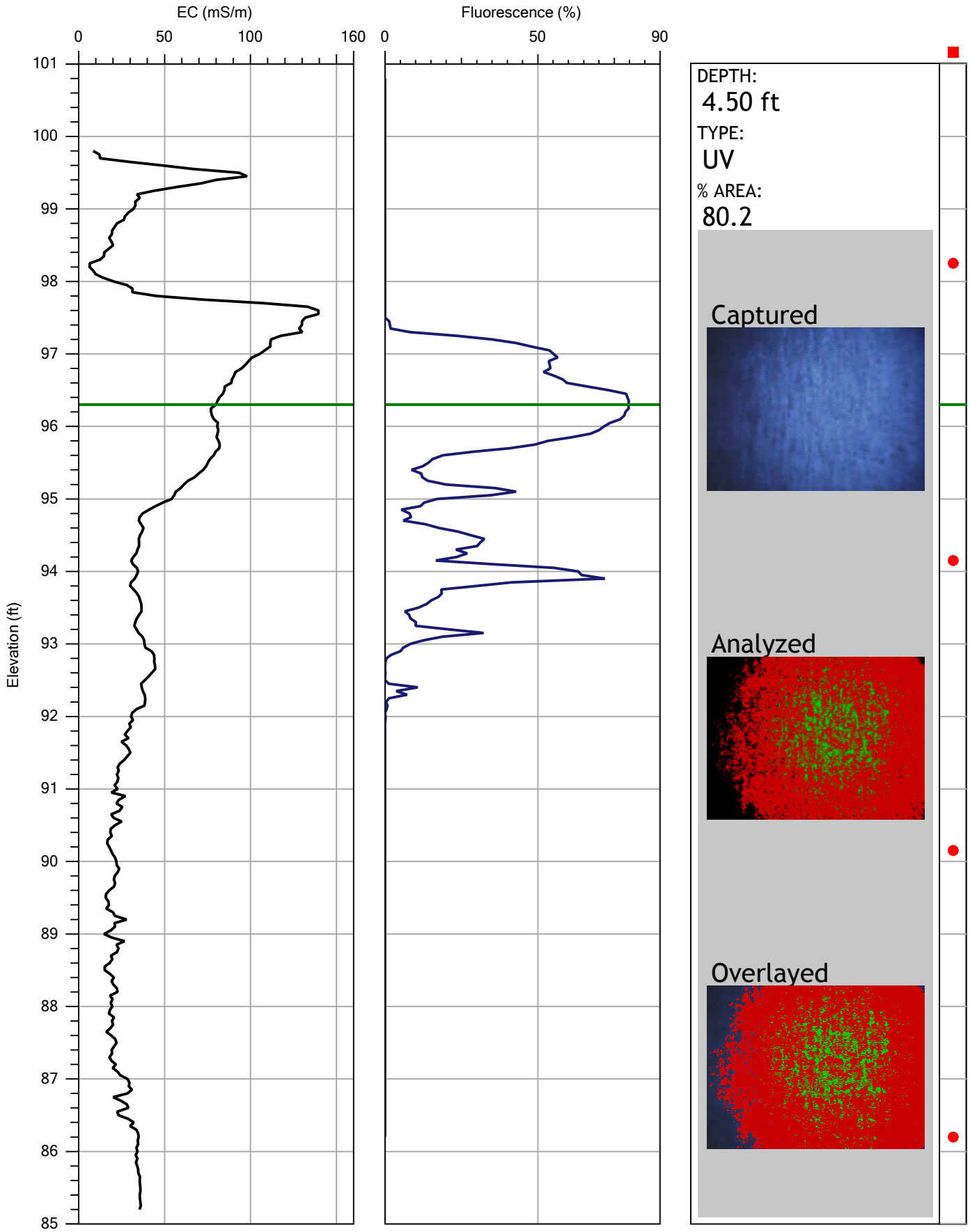

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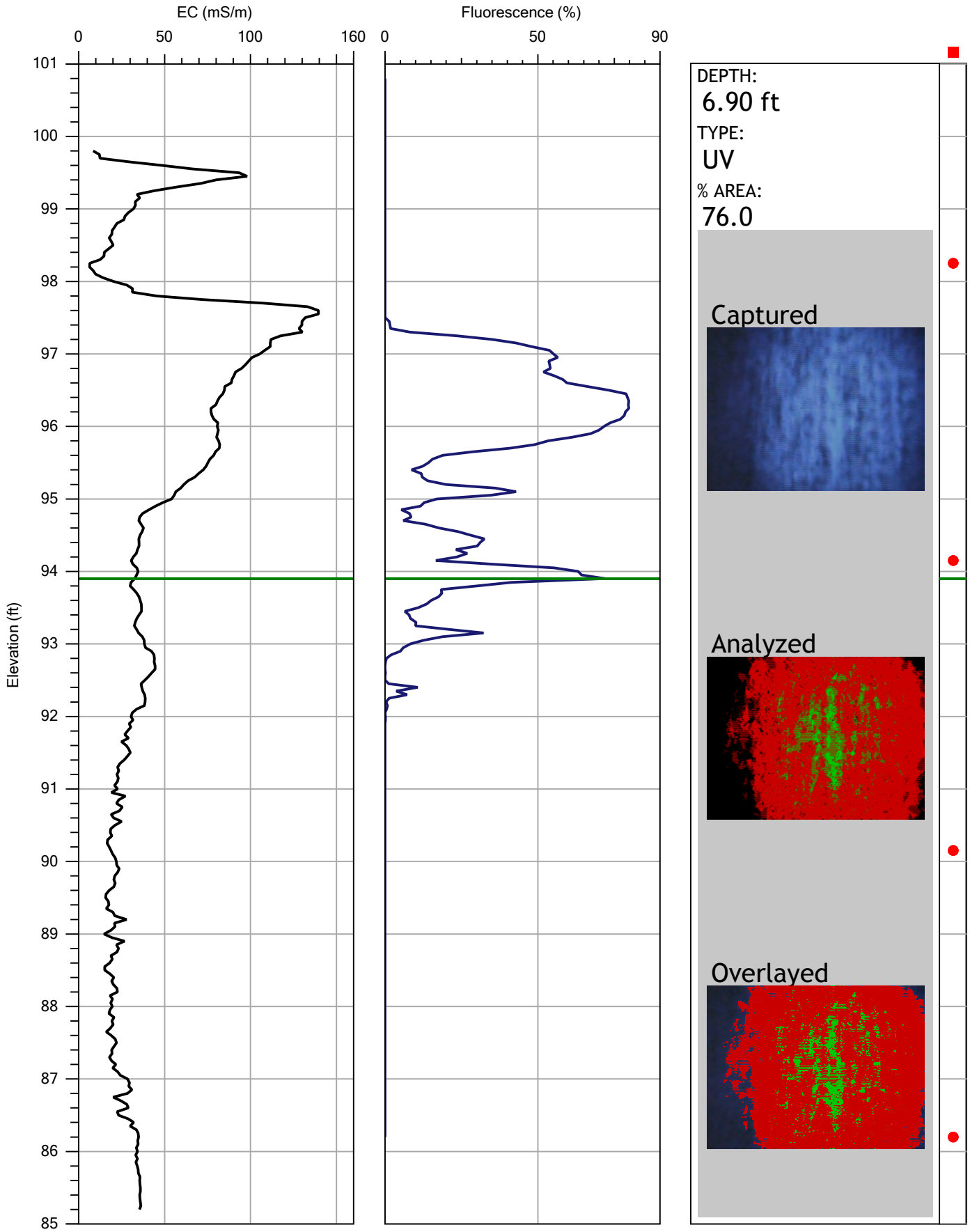
Project ID: Dead River		Client: ATC	Location: OIP-10



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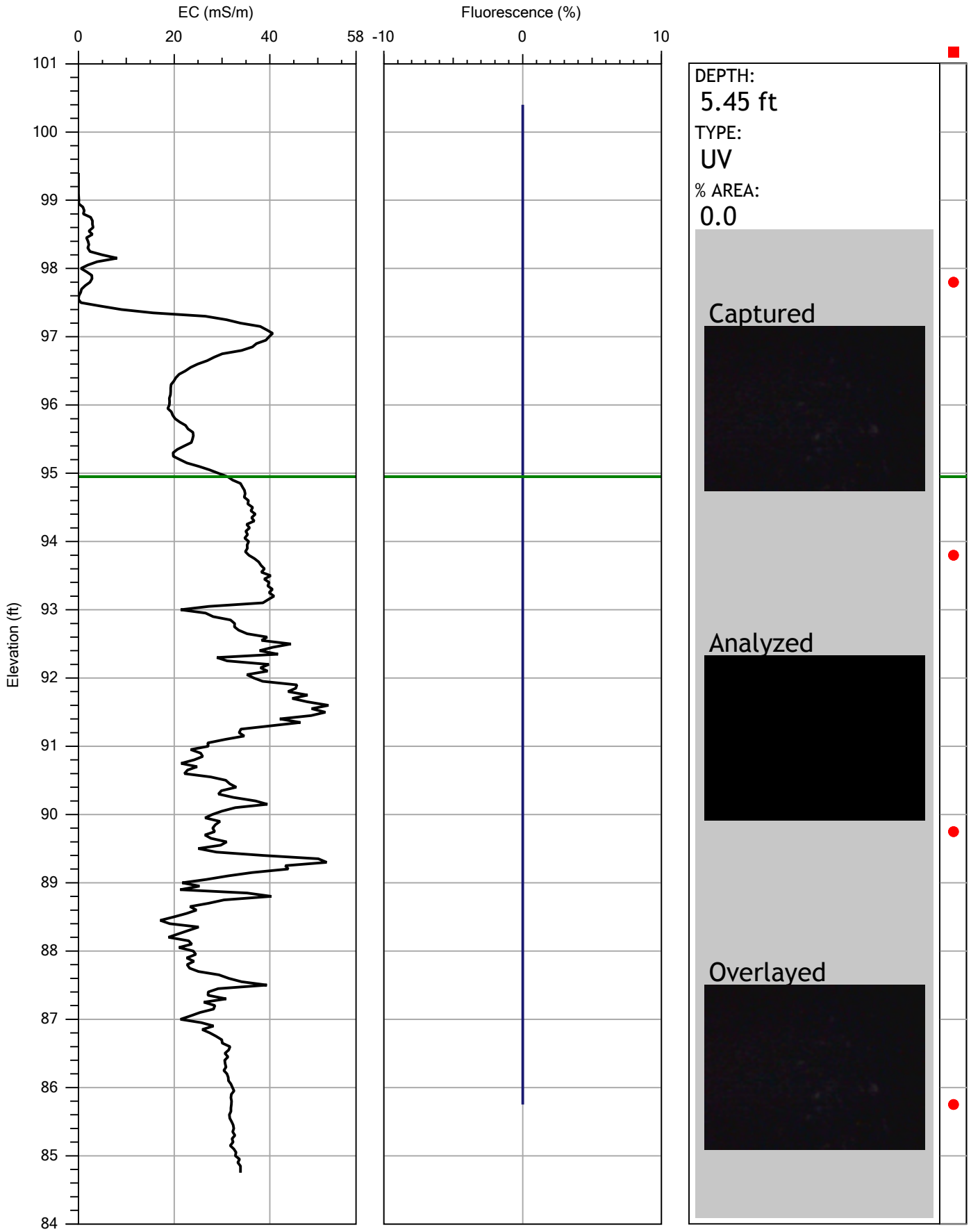

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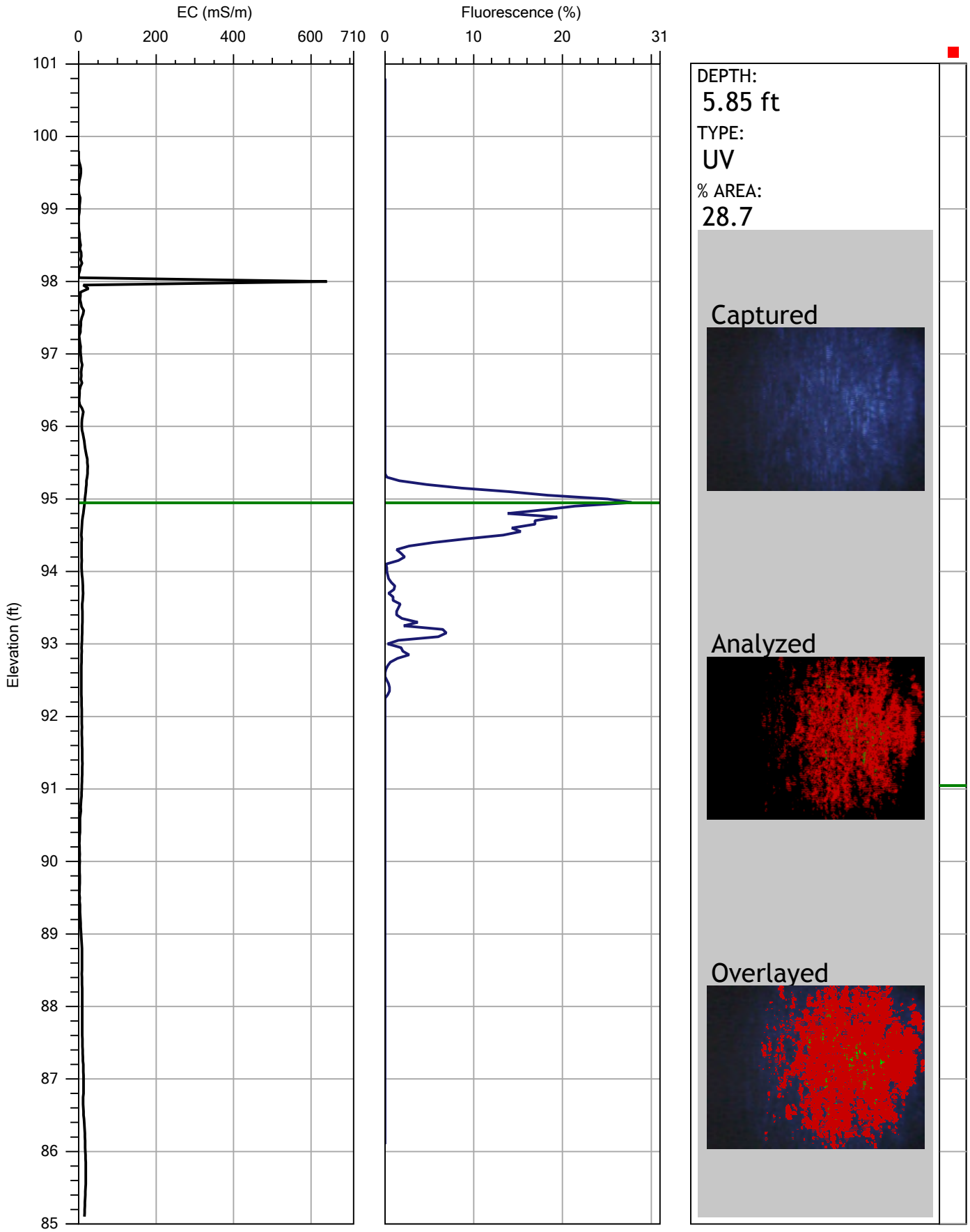

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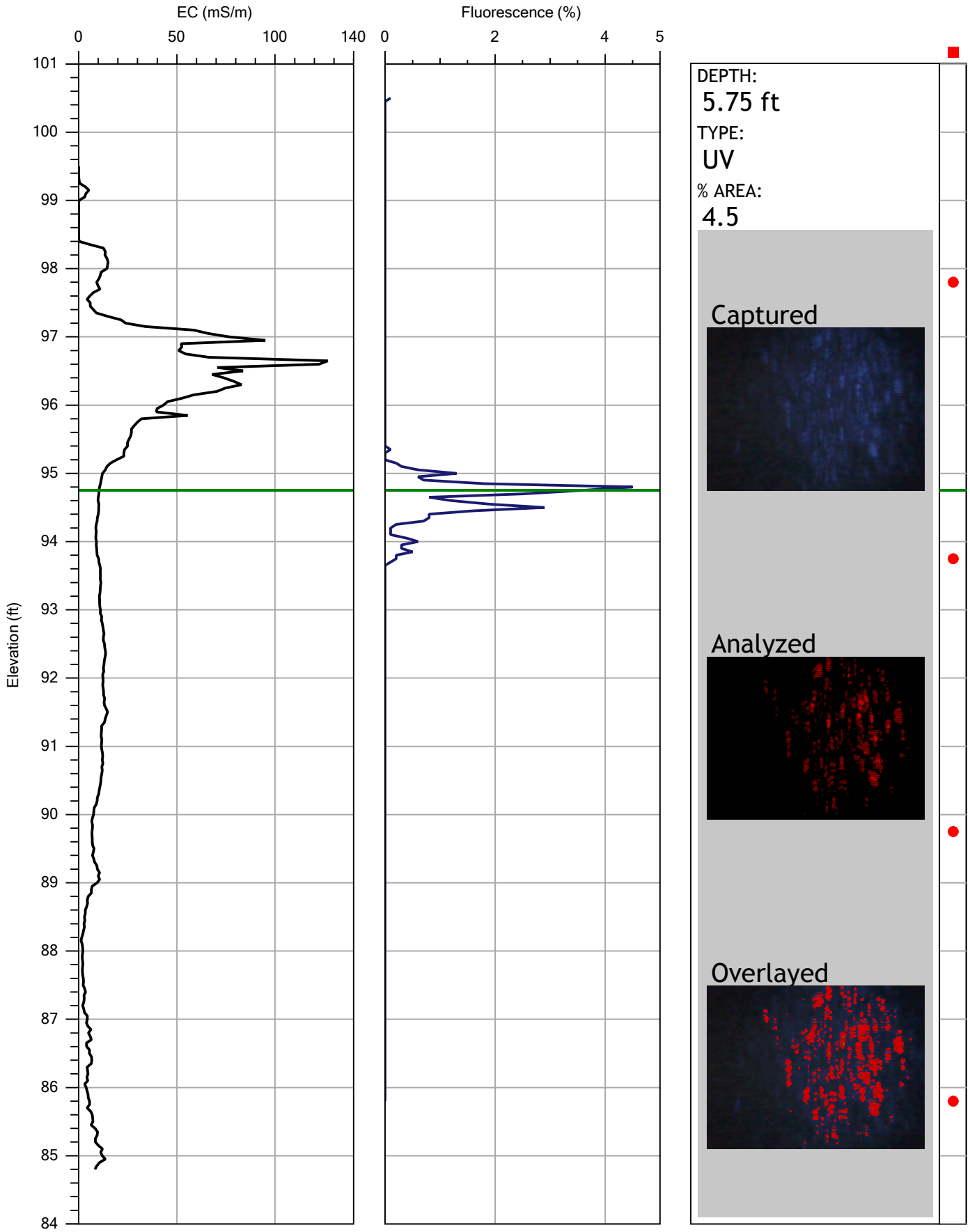

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